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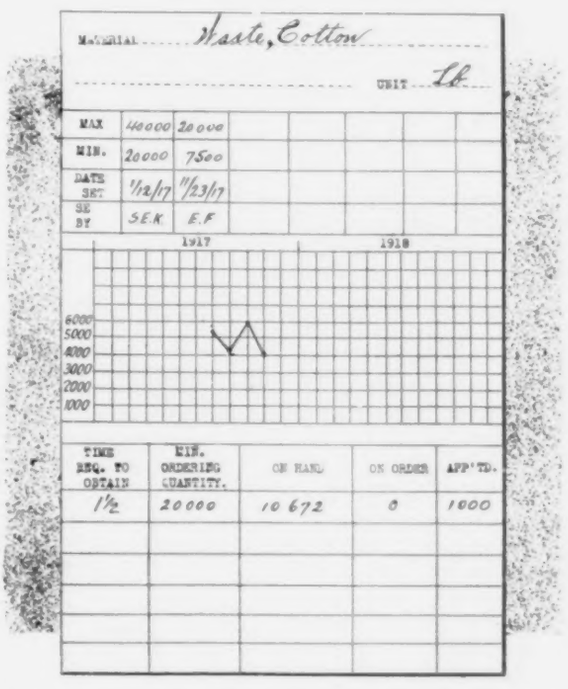
Fixing Quantities of Materials in Stock

A Method to Determine and Periodically to Revise Maxima and Minima of Stores—Purchases Are Controlled and Investment Savings Effected

BY E. W. TAFT*

THE purpose for which materials, both direct and indirect, are stocked by industrial concerns is to prevent breaks or interferences in production with the losses consequent thereon. As an offset to the saving due to having the materials on hand as required, there appears the interest on the capital necessary to maintain the stock. Obviously the most economical stock is that which prevents production delays at the least expense for interest charges.

In order to assure a constant supply of these materials, it is necessary either to schedule the materials as required by the production program or to maintain them in stock on a maximum and minimum basis. The consumption of nearly all direct materials and some indirect materials has a practically fixed and determinable relation to the volume of production. This class of materials may then be purchased on the basis of the production program. The other class of materials—most of which are indirect—do not offer themselves readily to this method of purchasing, but must be stocked on a maximum and minimum basis. In this class are such materials as cotton waste, lubricating and cutting oils, belting, small tools, office supplies, machine parts, etc.



What Is Known as Form No. 1 is Used to Determine From Time to Time the Amounts of a Given Material to Be Carried in Stock and Whether or Not More Should Be Ordered

Following is a method of establishing and revising the maxima and minima on these articles which affords a constant supply with a small average stock and a high average turnover. This method has been in force in the plant of the Winchester Repeating Arms Co. at New Haven, Conn., for nearly a year at this writing and has enabled the company to reduce considerably its investment in raw materials, with a resulting saving in interest that many times over pays for the additional clerical work incident to the method. At the same time it not only has not caused production delays due to lack of stock, but has insured a constant supply of materials, a condition which otherwise might not have been possible, due to the rapid changes in transportation facilities during the past year.

The above statements as to the reduction of inventory and the constancy of the supply are supported by the tabulated figures below. An examination of 232 materials selected at random from those which have been given the treatment described in this article shows the following condition as to changes in maxima and minima:

Revision of Quantities of Materials Kept in Stock

	Number	Per Cent
Maxima revised		
Up	29	12.5
Down	108	46.6
No change	95	40.9
Minima revised		
Up	80	34.5
Down	68	29.3
No change	84	36.2

These figures demonstrate that approximately 40 per cent of the maxima were correct for the conditions at the time of review, that 46 per cent were too high, and that only 12 per cent were too low. Of the minima examined, 36 per cent were correct, 29 per cent too high and 34 per cent too low. With 34 per cent of the minima too low the stock undoubtedly could not have been maintained at all times, while with 46 per cent of the maxima too high the company was carrying too large an investment in materials.

Form No. 1, here reproduced, is used for the collection and display of the data necessary to set properly the maximum and minimum quantities. The procedure in installing this form will first be described—then later the regular use. When the stock available on any item, carried on a maximum and minimum basis as shown by the balance of stores ledger has fallen to the minimum point, the

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balance of stores clerk, after filling out the necessary requisition on the purchasing department, fills out one copy of form No. 1 as follows:

(a) The clerk enters at the top the name by which the material is classified, as *Waste, Cotton.*

(b) Then the unit of issue, as *lb.*

(c) Then in the first vertical column beneath, the present maximum, minimum, date set, and set by, as: *Max.*, 40,000; *min.*, 20,000; *date set*, 1/12/17; *set by, S. E. K.*

(d) The next operation by the clerk is the charting on the diagram of, say, the past four months' issues of the material. Supposing the date at which the form was being installed on cotton waste to be Nov. 21, 1917, she would obtain from her record the monthly issues of waste for July, August, September and October. These might be as follows:

July	5,463 lb.
August	4,281 lb.
September	6,171 lb.
October	3,927 lb.

A scale is selected which will allow these figures to be charted. In this case it could be one unit on the chart = 1000 lb. The data are then charted as shown.

(e) Having done this the clerk enters in the proper columns the quantity "on hand," "on order," and "apportioned," for example:

On hand	10,672 lb.
On order	0 lb.
Apportioned	1,000 lb.

The form filled out to this extent is then attached to the purchase requisition and forwarded to the purchasing department, which fills in the two other columns, "Time Required to Obtain" and "Minimum Ordering Quantity." The time required to obtain is the total elapsed time from the time that the material available falls below the minimum until the new order is in stock and available for issue. This is estimated in the purchasing department, which in estimating introduces any necessary factor of safety. In this case it determined on 1½ months. The minimum ordering quantity is that quantity (a standard package or a multiple of standard packages) which obtains the best discount. This is also supplied by the purchasing department and is, say, 20,000 lb.

The purchase requisition and form are then returned to the balance of stores division, which, with the data on the form, re-sets if necessary the maximum and minimum. This is done as follows:

The management have determined that they wish to have the stock of raw materials turn over in general once every two months. To obtain the correct minimum we first observe the average monthly issues to be about 5000 lb.; multiplying this by the number of months required to obtain the material (1½) gives 7500 lb., the correct minimum. This is entered on the form as shown and on the balance of stores ledger as well. To obtain the correct maximum we multiply the average monthly issues (5000) by the turnover (2) and obtain 10,000 lb. This, however, is below the "minimum ordering quantity," so that the new maximum in this case would be 20,000 lb. This is entered on the form as shown and on the balance of stores ledger. The date set and set by columns are also filled in on the form as shown. Had the correct maximum been more than minimum ordering quantity, we would have set the new maximum at that multiple of the minimum ordering quantity nearest the calculated correct maximum.

The person having completed the calculations above, next notes whether the quantity available (on hand + on order — apportioned) is more or less than the new minimum. In this case it is greater, so the purchase requisition is destroyed and not passed through. Had it been less, the purchase requistion would have been sent to the purchasing department with the corrected maximum (20,000 lb.) on it as the ordering quantity. The form is then filed for the next future use. This completes the procedure for the original use of the form.

Future uses of the form are less complicated than the foregoing. The next time that the material available falls below the minimum, the form is withdrawn from the file; the new points on the curve are charted, and the procedure from (e) on is followed as before.

This method not only permits carrying a comparatively small stock of raw materials, but it allows it to be done with almost absolute safety from breaks in production due to lack of material, since the maxima and minima are automatically reviewed each time that the material available falls to the minimum, and is revised if changed conditions in production, traffic, or source of supply require it.

Specifications of the Employment Manager

The cost of labor turnover in industry is so large as to justify the adoption of almost any means to bring about its reduction. Faulty methods of hiring and discharging men is the most important factor in labor turnover, is the conclusion reached by Dr. Thomas T. Read of the New Jersey Zinc Co., in a paper read at the annual meeting of the American Institute of Mining Engineers on Feb. 21, from which the following notes are taken:

Employment managers have been used for the past few years by a number of large organizations, and they have invariably reduced labor turnover, in some cases to as little as one-tenth of what it had been.

Certain things are essential to success in centralized hiring of workmen. The employment manager should have either at his own command, or among his assistants, all the languages spoken in the company working force. He should interview the applicants for work in circumstances and with surroundings that indicate to the man that he is going to get a "square deal," and by putting the man on at a simple job and transferring him he should be able to train the man up to higher grades of work. The employment manager should be personally familiar with the work of the plant; if he has come up through the ranks so much the better. He should be provided with rough specifications as to the kind of men desired for a given kind of work. He should have notice as far in advance as practicable of the number of men desired so he can provide them when needed. He should have the necessary clerical help to keep his records in order and relieve him of all work that an ordinary clerk can do.

The employment manager must be of distinctly a higher type than the average foreman. He should have worked as a day-laborer himself, have been a foreman or superintendent of labor, but should not have had too much experience in any one department of the organization, lest he overemphasize that and slight the others. He should be familiar with working conditions in every part of the plant. He should be married, have children, and be over 30 years of age, otherwise he will not have had sufficient experience of the problems of human existence and will be too cocksure of his own judgment. On such matters as labor unions, the open shop, capitalism and labor, and so on, his attitude should be one of broad-mindedness. He should have a gift for acquiring and retaining the friendship of the men with whom he comes into contact, the power of compelling people to do what he wishes them to do without seeming to exert pressure upon them, good executive ability, enormous capacity for detail, ability

to keep his temper under the most trying conditions, and be willing to work almost day and night.

Power for Nitrate Plants

BIRMINGHAM, ALA., April 2—Experts representing eight leading power companies in the Carolinas, Georgia, Alabama and Tennessee and acting as a committee of the Ordnance Department have filed a report with Frederick Darlington of the War Industries Board showing that by interconnection of lines and Federal assistance they would have 150,000 hp. immediately available for additional nitrate plants, 450,000 hp. by the end of this year and 680,000 at the end of 1919. It is expected that one plant will be located near Knoxville, while still another may go to lock 12 on the Coosa River in Alabama, where the Alabama Power Co. has a large hydroelectric plant, or else to North Georgia. Announcement is expected soon.

BY-PRODUCT COKE INDUSTRY

Expansion Through 1917 and the Increased Capacity of the Present Year

In THE IRON AGE of Jan. 3 was printed an article contributed by C. J. Ramsburg, H. Koppers Co., Pittsburgh, emphasizing how important had been the expansion of the by-product coke industry in 1917. The table forming a part of that article has been revised and it now appears that plants under construction at the present time and calculated to go into operation in 1918 have an annual coke output exceeding 10,000,000 tons. In addition to the plants listed in the table, it may be noted that the Carnegie Steel Co. proposes to build 150 ovens at New Castle, Pa., and 210 ovens at Youngstown, Ohio.

BY-PRODUCT COKE PLANTS IN THE UNITED STATES JAN. 1 1918

Their Capacities for Coal Consumption, Coke, Ammonia and Toluol Production

Owner or Operator—Location	No. of Ovens	Kind of Ovens	Annual Capacity (Net Tons) Coal	Total Coke	Ammonia (as NH_3)	Toluol Gal.
Allegheny By-Product Coke Co., Glassport, Pa	120	Otto	260,000	195,000	650	90,000
Cambria Steel Co., Johnstown, Pa	462	343 Otto, 92 Koppers, 27 Gas Mach.	1,530,000	1,224,000	3,442	510,000
Carnegie Steel Co., Farrell, Pa	212	Otto	830,000	581,000	2,283	275,000
Semet Solvay Co., Dunbar, Pa	110	Semet-Solvay	248,000	173,000	682	82,000
Lehigh Coke Co., South Bethlehem, Pa	424	Koppers	2,400,000	1,920,000	5,400	800,000
Bethlehem Steel Co., Lebanon, Pa	318	228 Otto, 90 Semet-Solvay	887,000	638,000	2,267	295,000
Bethlehem Steel Co., Steelton, Pa	120	Semet-Solvay	516,000	371,500	1,354	170,000
Phila. Suburban Gas & Elec. Co., Chester, Pa	40	Semet-Solvay	125,000	87,500	313	41,000
Camden Coke Co., Camden, N. J	150	Otto	360,000	252,000	990	120,000
Empire Coke Co., Geneva, N. Y	46	Semet-Solvay	146,000	102,200	401	49,000
Lackawanna Steel Co., Buffalo, N. Y	469	188 Otto, 281 Rothberg	1,350,000	972,000	3,375	450,000
Solvay Process Co., Syracuse, N. Y	40	Semet-Solvay	65,000	45,500	195	21,000
New England Gas & Coke Co., Everett, Mass	400	Otto	650,000	455,000	1,950	330,000
Bethlehem Steel Co., Sparrows Point, Md	120	Koppers	730,000	525,600	1,825	240,000
National Tube Co., Benwood, W. Va	120	Semet-Solvay	270,000	189,000	743	90,000
Laclede Gas Light Co., St. Louis	56	Koppers	320,000	240,000	880	110,000
Minnesota Steel Co., Duluth, Minn	90	Koppers	600,000	450,000	1,500	200,000
Zenith Furnace Co., Duluth, Minn	65	Otto	160,000	112,000	440	50,000
Cleveland Furnace Co., Cleveland	100	Semet-Solvay	450,000	337,500	1,125	150,000
Republic Iron & Steel Co., Youngstown, Ohio	143	Koppers	1,020,000	744,600	2,805	340,000
Youngstown Sheet & Tube Co., Youngstown, Ohio	204	Koppers	1,300,000	949,000	3,575	430,000
Toledo Furnace Co., Toledo, Ohio	94	Koppers	560,000	408,800	1,540	180,000
United Furnace Co., Canton, Ohio	47	Koppers	280,000	204,400	770	90,000
Hamilton-Otto Coke Co., Hamilton, Ohio	100	Otto	240,000	168,000	720	80,000
Milwaukee Coke & Gas Co., Milwaukee, Wis	160	Semet-Solvay	732,000	549,000	2,104	244,000
Northwestern Iron Co., Mayville, Wis	72	Otto	320,000	230,400	800	100,000
Citizens Gas Co. (1), Indianapolis	41	Semet-Solvay	330,000	237,600	908	110,000
Citizens Gas Co. (2), Indianapolis	100	Otto	320,000	230,400	880	110,000
Illinois Steel Co., Gary, Ind	560	Koppers	3,600,000	2,880,000	7,650	1,200,000
Central Indiana Gas Co., Muncie, Ind	22	Klonne	40,000	28,000	100	13,000
Inland Steel Co., Indiana Harbor, Ind	130	Koppers	890,000	666,800	2,336	295,000
By-Products Coke Corporation, South Chicago, Ill	280	Semet-Solvay	1,300,000	975,000	3,575	433,000
North Shore Gas Co., Waukegan, Ill	13	Semet-Solvay	55,000	38,500	165	18,000
Coal Products Mfg. Co., Joliet, Ill	53	35 Koppers, 18 Wilputte	340,000	238,000	1,020	110,000
Illinois Steel Co., Joliet, Ill	280	Koppers	1,500,000	1,200,000	3,375	500,000
Semet Solvay Co., Detroit	175	Semet-Solvay	1,150,000	862,500	3,163	380,000
Michigan Alkali Co., Wyandotte, Mich	30	Otto	94,000	65,800	235	31,000
Kentucky Solvay Coke Co., Ashland, Ky	108	Semet-Solvay	800,000	600,000	2,400	260,000
Woodward Iron Co., Woodward, Ala	230	170 Koppers, 60 Wilputte	1,330,000	997,200	3,207	433,000
Tennessee Coal, Iron & R. R. Co., Fairfield, Ala	280	Koppers	1,650,000	1,254,000	4,538	550,000
Semet Solvay Co., Ensley, Ala	240	Semet-Solvay	540,000	410,400	1,485	180,000
Central Iron & Coal Co., Holt, Ala	60	Semet-Solvay	290,000	220,400	800	96,000
River Furnace Co., Cleveland, Ohio	204	Koppers	1,300,000	960,000	4,600	520,000
LaBelle Iron Works, Steubenville, Ohio	94	Koppers	610,000	445,000	1,677	210,000
Brier Hill Steel Co., Youngstown, Ohio	84	Koppers	520,000	379,000	1,430	140,000
Semet-Solvay Co., Buffalo, N. Y	60	Semet-Solvay	366,000	269,000	945	100,000
Gulf States Steel Co., Gadsden, Ala	37	Koppers	237,000	175,000	575	80,000
Semet-Solvay Co., Detroit	40	Semet-Solvay	250,000	170,000	580	85,000
Seaboard B. P. C. Co., Jersey City, N. J	110	Koppers	800,000	600,000	2,400	280,000
Portsmouth Solvay Coke Co., Portsmouth, Ohio	108	Semet-Solvay	700,000	520,000	2,000	260,000

Last eight installations put into operation in 1917.

The following plants are under construction and will go into operation during the year at approximately the time designated (present construction conditions make false prophets).

Owner or Operator—Location	No. of Ovens	Kind of Ovens	Annual Capacity (Net Tons) Coal	Total Coke	Ammonia (as NH_3)	Toluol Gal.	Expected to Operate
Minnesota By-Product Coke Co., St. Paul, Minn	65	Koppers	400,000	300,000	1,200	160,000	1/15/18.
Carnegie Steel Co., Clairton, Pa	640	Koppers	4,000,000	2,800,000	12,000	1,600,000	4/1/18.
Bethlehem Steel Co., Steelton, Pa	60	Koppers	360,000	250,000	1,100	130,000	4/1/18.
Bethlehem Steel Co., Sparrows Point, Md	240	Koppers	1,440,000	1,000,000	4,400	520,000	7/1/18.
Illinois Steel Co., Gary, Ind	140	Koppers	800,000	600,000	2,000	200,000	2/15/18.
Colorado Fuel & Iron Co., Pueblo, Col	120	Koppers	720,000	550,000	2,100	260,000	2/15/18.
Chattanooga Coke & Gas Co., Chattanooga, Tenn	24	Semet-Solvay	100,000	60,000	260	30,000	.....
Ford Motor Co., Detroit	120	Semet-Solvay	700,000	500,000	2,000	250,000	.....
By-Products Coke Corporation, Indiana Harbor, Ind	120	Semet-Solvay	700,000	500,000	2,000	250,000	.....
National Tube Co., Lorain, Ohio	208	Koppers	1,200,000	850,000	3,600	450,000	5/1/18.
Dominion Iron & Steel Co., Sydney, N. S	120	Koppers	720,000	500,000	2,200	280,000	5/1/18.
Youngstown Sheet & Tube Co., (2) Youngstown, Ohio	102	Koppers	600,000	420,000	2,000	200,000	6/1/18.
Steel Co. of Canada, Hamilton, Ont	60	Wilputte	320,000	210,000	800	100,000	.....
Algoma Steel Co., Sault Ste. Marie, Mich	25	Wilputte	130,000	90,000	320	40,000	.....
Seaboard B. P. Coke Co., Jersey City, N. J	55	Koppers	400,000	300,000	1,200	140,000	11/1/18.
Providence Gas Co., Providence, R. I	40	Koppers	240,000	165,000	650	100,000	12/1/18.
Ironton Solvay Coke Co., Ironton, Ohio	60	Semet-Solvay	366,000	269,000	945	100,000	6/1/18.
American Steel & Wire Co., Cleveland	180	.....	1,080,000	750,000	3,300	330,000	5/1/18.
Totals	2,379	.....	14,276,000	10,114,000	42,075	5,140,000	

NEW LABORATORY FOR BRASS

The Scovill Manufacturing Co.'s Extensive Equipment—Employment of Young Women

The Laboratory

A NEW laboratory recently completed by the Scovill Mfg. Co., Waterbury, Conn., contains a number of interesting features. This company's brass manufacturing and fabricating plant employs 14,000 persons and consumes large quantities of copper, spelter and other materials. All are carefully tested before entering into consumption.

The laboratory is used for chemical and physical tests of all products at various stages of manufacture and of metals sent in as specimens for duplication or as bases for specification. Facilities are also included for the testing of steel, concrete, paints, coal, oil and other commodities purchased for use in the plant. The building has been designed throughout so that every kind of work can be carried on with thoroughness and rapidity in its own department, specially fitted for the purpose and without interfering with any other work.

This laboratory is noteworthy for the high development to which electrolytic methods of separating the metals in making analyses is carried. An illustration shows the unusual and interesting equipment for this purpose. The deposition is all made in platinum electrodes and this equipment is stated to be the most extensive of its kind in existence, typifying a method which was largely perfected in its application by the Scovill Mfg. Co.

The staff in the chemistry and testing departments proper consists of a chief chemist, assistant and about 40 chemists. Recently young women have been introduced for the routine work in brass analyses. Though not chemists in any sense, they have proved very satisfactory and the excellent work they have done indicates a field of usefulness in which women can safely be placed.

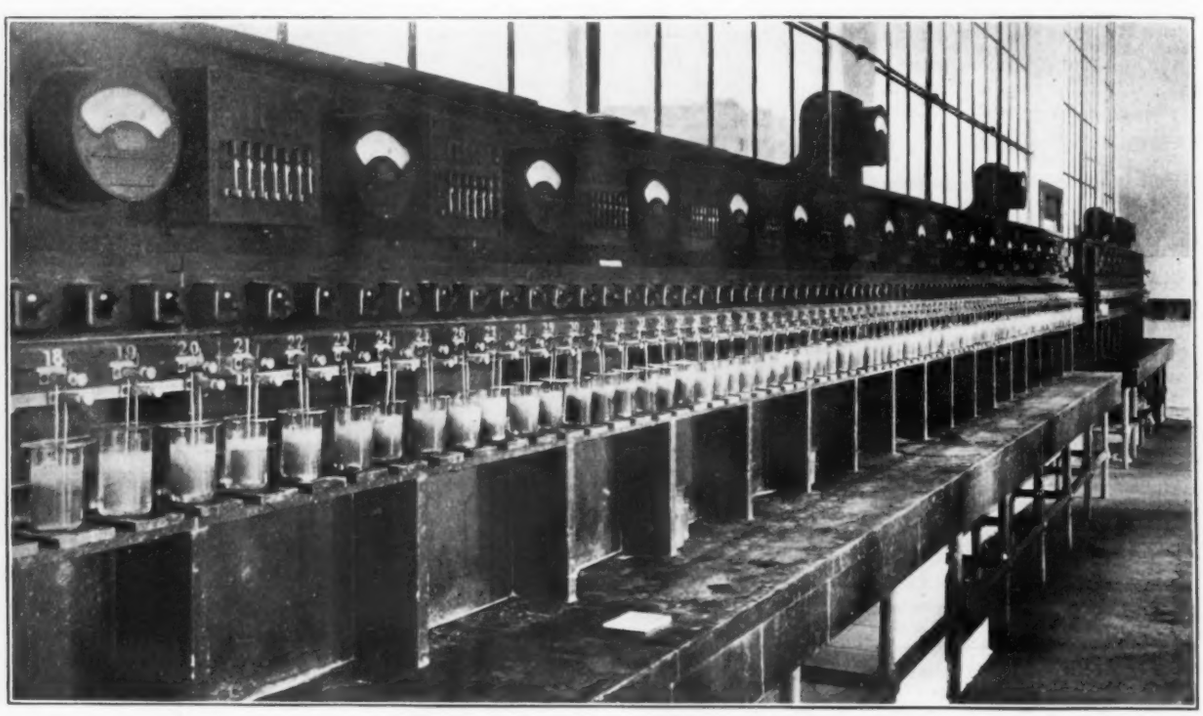
The building is one story, 55 ft. wide by 214 ft. long, and is of reinforced concrete, with steel sash, wire glass, steel trim, concrete floors covered with agatex and hard wood, and is fireproof even to the extent of using alberene stone tables throughout the laboratory and steel tables, desks, filing equipment, etc., for office service. Further fire protection is afforded by conveniently located hand extinguishers and by standpipes and hose served by the city mains. The lighting throughout is indirect from Mazda bulbs of various powers.

Many comforts and conveniences are provided for the employees. A Sturtevant ventilating system produces a complete change of air throughout the building every two minutes, none of the old air being recirculated. The air supply, taken from outside, passes first through steam coils, which impart the proper temperature, then through an air washer that removes any floating impurities, and from there is delivered through ducts to various parts of the building. In this manner the air is kept constantly sweet and pure, without the opening of windows and without perceptible draft.

An interphone system connects all rooms with each other, with the rest of the plant and with outside telephone service. A vault is provided for the storage of important records, for platinum crucibles and electrodes and for other valuable material. A separate library is well equipped with a large selection of technical books on chemistry and metallurgy and contains also files of the prominent American and foreign technical papers.

The physical testing room contains two Olsen machines with a capacity of 100,000 and 50,000 lb. respectively, equipped with the latest automatic and autographic devices for registering tensile and compressive tests; one Ehrichsen metal tester and one Olsen machine for determining cupping ability and fatigue; a Brinnell hardness meter and a scleroscope for testing hardness.

Another separate room contains four furnaces for calibrating pyrometers by special methods, two furnaces for experimental annealing and four grinders for polishing specimens for microscopic examination. All apparatus in this room is controlled



The Large Electrolytic Equipment of the Scovill Manufacturing Co. for Analyzing Brass and Other Non-Ferrous Metals by Deposition on Platinum Electrodes. This is said to be the largest installation of this kind in the country

from two panel boards within. The microscopic room contains a Leitz microscope for making visual examinations and micrographs at any magnification up to 1000 diameters. Samples from the outside or from the mills are compared under this microscope, with standardized alloys. This comparison is very important in the determination of chemical composition and temper of an alloy. The microscopic comparisons are usually made at a standard magnification of 75 diameters.

The laboratory contains five benches for general chemical work, three hoods for carrying away fumes, and the board for electrolytic deposition of copper and lead from any number of specimens up to 150 at one time. All hoods and tables are equipped with special dust-proof plugs for electricity, and with heat, low pressure air, gas and distilled water. Each of the hoods has an individual exhauster and vent. The distilled water used throughout the laboratory comes from a two-effect still having a capacity of 1200 gallons per day.

Electricity for power, electro-chemical process, heating and lighting comes in from the main power plant as 2300 volts alternating current and is transformed down to 440, 220 and 110 volts. Two converters also provide direct current at 120 and 12 volts respectively. If for any reasons the generators fail temporarily, the load is automatically switched onto a standby battery capable of furnishing 750 amperes for four hours. A panel board in this power room controls the electrolysis board.

French Aluminum Capacity Leads

Aluminum is the metal which is responsible for the entrance of France into the field of electrometallurgy. The following table gives the relative production capacities of different countries two or three years before the war and shows that France led the world with a productive capacity equal to 39.2 per cent of the total.

Production Capacity for Aluminum Before the War

Country	Number of Companies	Number of Plants	Aggregate H.P.	Capacity in Tons per Year	Per Cent of Total
France	6	10	140,000	19,000	39.2
United States	3	3	105,000	12,500	25.8
Canada	1	1	20 000	2,500	5.2
Switzerland	1	2	27,000	6,000	12.4
Germany	1	1	5,000	600	1.2
Austria	1	1	5,000	800	1.6
England	2	2	21,000	3,800	7.8
Norway	2	2	21,000	2,100	4.3
Italy	2	2	4,000	1,200	2.5
Total	19	24	348,000	48,500	100.00

Of the 10 French aluminum plants, the nine in the region of the Alps represent an aggregate of 12,000-hp.; the other is in southern France. It is interesting to note from 1886 to 1896 it was Switzerland and not France that led the world in aluminum capacity. After that time its capacity remained nearly stationary, while that of France continued to increase. One important reason why France attained a leading position was that at first and until recent years practically all the bauxite used for making aluminum came from France. The French bauxite is generally considered superior in quality to that from any other source. In spite of her great advantages, however, France has not retained the leading position. With a domestic consumption of only about 3000 tons, and a production capacity of 19,000 tons per year, there is a large surplus which must find a market abroad.

The Merchants National Bank of Boston has published a booklet for gratuitous distribution on "Motor Truck Transportation." The booklet has been published to assist manufacturers and others in the solution of transportation problems arising from increased production and failure of the railroads to bear this burden.

RIBBON ZINC

Its Use as a Substitute for Sheet Brass

BY H. D. MURPHY

In the days prior to the fixing of the price of copper by the Government the path of the manufacturer who used extensively alloys containing this metal was not one of roses. While those engaged in other lines were busy devising substitutes, or, if they had been importing, were learning to produce the same article in this country, the man whose prosperity depended on marketing a product composed at least in part of copper and spelter or copper and tin saw prices go skyward, and scanned the firmament in vain for any evidence of coming relief.

Rolling mills not only refused to make quotations, stating that brass in any form would be invoiced at prices ruling at date of shipment, but also refused to commit themselves as to when orders would be shipped. Furthermore, the buyer had to agree that once he was notified of the formal acceptance of his order no cancellation would be permitted.

In the midst of this nerve racking state of affairs there came to us one day a bright star of hope in the person of a salesman from a firm with which it was our custom to place orders for spelter. He stated that one of the companies supplying them had perfected a substitute for sheet brass which they called "ribbon zinc." He wished to sell us a sample roll, believing we would find it adaptable to our purposes, and named a price so much below brass as to nearly take away our breath. Also, he could actually give shipping dates on repeat orders if we found it satisfactory.

Previously we had several times made up cab lamp shields of sheet zinc. This was a slow and unsatisfactory process, as the metal had to be spun while hot, each blank being heated in a small fire in a receptacle placed beside the spinning lathe. However, being told that this new metal needed no such treatment it was given a trial. Our requirements are usually for material 9 in. in width and of about 20 or 21 B & S gage.

In spinning shallow canopies, say about 2 in. deep and about 4 in. in diameter, it is fully equal to brass. When attempts are made to spin it to a depth of 4 in. it will not stand annealing and cracks. This also occurs in shallower shells if spun into a small diameter making a pronounced neck. We have used considerable of this metal in spinning rings for holding glass dishes or bowls for close ceiling lights and semi-indirect fixtures which are suspended by chains. These are of all diameters from 8 in. up, but do not run much over 2 in. in depth, as they are intended merely as holders for the glass, which is the real decorative part of the fixture.

In the manufacture of hall and vestibule lanterns, which is hand work exclusively, this ribbon zinc has proved an excellent substitute for brass. After being laid out and cut the various parts are soldered with the same ease, and the completed frame is as firm as in the case of sheet brass.

In the manufacture of lighting fixtures for private residences, public buildings, etc., the matter of finish must be given serious consideration, as the architect naturally desires that conformity to the general decorative scheme shall be strictly observed. Here again the new metal has not failed us. It takes a heavy copper plate, after which it is possible to apply any oxidized finish, whether it be a Japanese bronze of an antique brass. If a white finish be desired for a bathroom fixture or for hospital work the copper plate can be dispensed with and the enamel applied direct.

No doubt other manufacturers are finding uses for ribbon zinc based on their own requirements, which are widely divergent from ours, and it will probably develop a field which it will continue to hold after the country and its business have returned to that condition which we still hopefully term normal, but which, deep down in our hearts, we know will never be "just the same."

Shipbuilding and Labor Problems

Charles Piez Emphasizes Statement That Workers Must Be Released for Ship Work —Says Eight-Hour Day Is Inevitable

CHARLES PIEZ, vice-president and general manager Emergency Fleet Corporation, addressing the members of the Indianapolis branch of the National Metal Trades Association, at the twelfth annual dinner of that body, in Indianapolis, March 25, advised employers to conform with the trend toward the 8-hr. day and to give labor a fair share of abnormal profits. Though he said he did not come as a messenger from the Government, he answered criticisms of the labor policy of the Emergency Fleet Corporation, and frankly asserted the determination of the corporation to pay wages that will "lure competent and experienced workers into the shipyards," also that the unions had given substantial and welcome aid to the wage adjustment board. He regretted that the policy of the corporation should prove embarrassing to industry, and said that while he did not oppose general wage advances, such advances by private employers, if intended to prevent the transfer of workers to Government employ, were improper and unpatriotic. He declared himself to be skeptical as to the efficacy of conscription of labor. He ardently advocated centralization of power in the hands of the President, also referred to the gigantic magnitude of the war machine in process of formation.

> We have spent the year not in conflict, but in preparation for conflict.
>
> The President should in this crisis be given exceptional powers, so that he can delegate them or reassign them as the exigencies of war may demand.
>
> We must meet every demand in a spirit of loyal helpfulness, every sacrifice with cheerful fortitude and the firm conviction that a strong government makes for a short war.
>
> Industry, like the army, must strip for the fight and bend to the iron rule of camp discipline.
>
> Our war machine is but beginning to find itself.

Speaks as a Fellow Manufacturer

Mr. Piez spoke as follows:

"Let me say that I come not as a messenger from any department of the Government, but simply as one who for many years has had manufacturing interests in this community and who joins with you in celebrating the development of your city into one of the important industrial centers of the country. My words must not be given special significance, for they are but the expressions of a fellow manufacturer enjoying a temporary respite from the cares of business.

"We are just completing the first year of the war, yet I fail to find in this assembly any evidence of the deprivation and suffering that war is supposed to carry with it, and there is justification for this fact, for we have spent the year, not in conflict, but in preparation for conflict.

"Industrially, the year has been one of highly intensified productive activity, attended, it is true, with many vexations and troubles, but one which in the matter of profits has given exceptional returns for whatever efforts we have put forth, for whatever burdens we have carried.

"We have witnessed on the part of the Government a gradual though rather timid intervention in the affairs and processes of business, and while we have submitted, we have looked on this moderate extension of the Government's powers with some concern. The weight of the income tax has proved a most fertile cause for complaint, despite the fact that the profit balance remaining is still of highly gratifying proportions. We have viewed with much apprehension the Federal control of food and fuel, and we are inclined to look upon the Federal control of railroad operations as a tremendous step toward state socialism. Yet these are but the first steps toward the complete mobilization of our national resources; and if any criticism is to be offered, it is that these steps, out of deference, no doubt, to our intensely individualistic prejudices, were neither radical enough nor undertaken promptly enough.

Powers of President Should Be Broad

"I am a strong convert to the doctrine that the President should in this crisis be given exceptional powers, so that he can delegate them or reassign them as the exigencies of war may demand. War requires swift decisions, radical changes; it leaves but little time for discussion. Our ingrained reluctance to place too much power into the hands of a single leader, our apprehension that power once granted is difficult to withdraw must in these times be subordinated to the common purpose, victory, and to the common peril, defeat. The Federal Government must not only be made the Government of the nation, but the controller of the activities of each individual or group of individuals, for only through the completely centralized control of every activity, every purpose of the individual, as well as of the nation, can we hope to win. We must, therefore, meet every demand in a spirit of loyal helpfulness, every sacrifice, with cheerful fortitude and the firm conviction that a strong government makes for a short war.

Control of Industry Hardly Begun

"This will be a long war, and industry, like the army, must strip for the fight and bend to the iron rule of camp discipline. Business as usual is out of the question. There can be nothing as usual in time of war. I feel that the control of industry has hardly begun, that it must be tremendously extended and much more positively asserted if we are to marshal our resources most effectively for a swift and successful outcome. Our national needs must be classified in the order of their importance and must be met even at the expense of radical industrial readjustments. The time has come when the newly reorganized War Industries Board must take more definite control of the industries and when the non-essential ones must yield positive priority to those absolutely essential to the conduct of the war; priority not only in materials, in transportation and in finance, but priority in labor as well.

"Our war machine is but beginning to find itself. Out of the disorder of the frantic but wholly uncorrelated efforts of those early months there is gradually evolving a purposeful, closely-knit organization, not yet fully responsive to all of our needs, not yet working under a single and properly co-ordinated plan, but heading swiftly and inevitably toward that highly desirable goal.

"Those of us who have had to do with the organization and development of new industrial enterprises or even the rapid and material expansion of existing ones, can appreciate the value of time as the most essential element in developing the equipment, the methods and an organization with the proper spirit and harmony of effort to bring forth orderly and profitable accomplishments.

"There is hardly a department serving the war purpose of the Government which, measured by volume to be done in the second year of the war, does not materially exceed the volume of the United States Steel Corporation, and yet these departments, if they had existence at all a year ago, had purely embryonic ones. Is there any wonder then that each department developed in line with its own needs and gave but passing thought to the needs of the whole? The mere taste of development made every other consideration subservient. But the time is now ripe for placing these departments under a single control, which will compel their co-operation toward a single end; and the Overman bill now before Congress promises to place that power positively into the hands of the President

Conscription of Labor Not Favored

"The Emergency Fleet Corporation has recently been severely criticized by many employers' associations for its labor policy. We are charged with seriously damaging industry by paying excessive wages, by extending the application of the basic 8-hr. day and by playing into the hands of the unions. We are criticized for not having a strong labor policy, for not conscripting every one between the age of 18 and 60. Conscription of labor is announced as the panacea for labor troubles, but after four months of intimate contact with these troubles, I am still highly skeptical of its efficacy. We are fighting the cause of democracy, which means the right of self-determination and development of the individual and, fighting in that cause, we have thus far considered patience and persuasion more effective in the handling of labor problems than conscription.

Explains Labor Policy

"Let me say, not in defense but in explanation of the Fleet Corporation's labor policy, that we deliberately determined to pay wages that were generous enough to lure competent and experienced workers into the shipyards, and I am confident not only that this decision was justified but that it was wise. We have increased our shipbuilding facilities several fold since entering the war and, as we expect to devote future efforts to ship rather than yard construction, it is essential that the facilities be used to their maximum output. Now 300,000 skilled men actuated by a loyal purpose will turn out between 6,000,000 and 7,000,000 dead weight tons of shipping per annum, and this number can with an extension of housing and transportation facilities be readily taken care of in yards now completed or nearing completion. But 300,000 half skilled men with a goodly sprinkling of shirkers will turn out barely half this production, necessitating either a corresponding reduction in our expected output or a vast extension of shipyard facilities. The statement that high wages reduce rather than increase output cannot, in my opinion, be substantiated. It is natural that during the influx of large numbers of green men the output per man will be reduced, but competent shipyard management will rapidly select men on the basis of output rather than attendance when wages are high enough to attract men in considerable numbers. It takes time to train men to new duties, but mechanics who have developed skill and experience in kindred pursuits can be quickly trained to even the complicated tasks of the shipyards. We can stand the temporary reduction of output while the men are gaining experience, and there is no evidence thus far offered that points to a deliberate and general letdown of effort.

"If such a situation does develop, I feel certain that the labor leaders will join with us in checking this form of sabotage. In the meantime we are spending time and effort in convincing the shipyard workers of the paramount importance of their task and in bringing the communities generally to an appreciation of this same fact.

Considers 8-hr. Basis Inevitable

"The present administration stands firmly committed to a basic day of eight hours. This does not mean that industry is limited to eight hours on a shift, but merely that any time in excess of eight hours is paid for on an overtime basis. The application of the 8-hr. day is being very widely extended, and my suggestion is that those employers who are still working on the 10-hr.-day basis had better begin an immediate reduction of hours on straight time and adjust themselves promptly to the inevitable.

"Concerning the charge that we are playing into the hands of the unions, let me say that the wage adjustment agreement under which the shipyard workers are operating has been, on the whole, a most effective instrument in adjusting labor disputes and preventing walkouts and strikes. With the exception of a single craft it has had the warm indorsement and loyal support of the American Federation of Labor and its leaders, and we have welcomed the substantial aid which they have given us in making the decisions of the wage adjustment board effective. That the unions are, during this era of exceptional industrial activity, extending their membership cannot be denied; but they are doing this much as a manufacturer extends his business during periods of exceptional opportunity. The decisions of the wage adjustment board all carry with them a clause interdicting discrimination against either organized or unorganized workers, and the Emergency Fleet Corporation stands firmly by this policy of equal opportunity for all.

We are fighting the cause of democracy, which means the right of self-determination and development of the individual, and, fighting in that cause, we have thus far considered patience and persuasion more effective in the handling of labor problems than conscription.

The statement that high wages reduce rather than increase output cannot, in my opinion, be substantiated.

There is no evidence thus far offered that points to a deliberate and general let-down of effort (by labor).

The present Administration stands firmly committed to a basic day of eight hours.

That the unions are, during this era of exceptional industrial activity, extending their membership cannot be denied.

Industry Must Surrender Workers

"That the wage policy adopted by the Fleet Corporation should prove embarrassing to industry is regrettable, but if industry will look upon this wage increase as a war measure intended to attract workers to the most essential part of the war program and will bear it in the same philosophic and resigned spirit in which it bore the draft, it will find that the burden will be but temporary. Industry, broadly speaking, can well afford to surrender a portion of its effective workers for the construction of absolutely vital ocean carrying tonnage and to undertake the training of green hands to take their place. Meeting the wage schedule to prevent this necessary transfer of workers would, therefore, not only be highly unpatriotic, but would prove futile in the end. We must have the men. We can't conscript them, therefore we must attract

them into the service of the shipyards, and industry will bear the sacrifice bravely.

"But let it not be understood that I oppose any wage increases. Industry has been extremely prosperous for the past two years. Have the men in charge of the industries been conscious of the great increases in the cost of living, and have they given their employees a fair share of this prosperity?

"The war is casting us loose from our old anchorages, and unless we set about to find some safe haven for the coming industrial readjustments, we will find ourselves dangerously adrift when the storm comes. Labor is going to insist on a more equitable distribution of the proceeds of industry. It is difficult to meet this with any generally applicable scheme of profit-sharing because of the wide variations in conditions, but it can be met in part at least by recognizing labor's share in the creation of profits and acting on this in a just and generous spirit. Exceptional returns due to unusual conditions certainly justify liberal wage returns to the workers. The sentiment at the bottom of the present widespread labor unrest is that industry is profiteering, that it is making huge returns out of the war and that labor is not getting its fair share.

Profiteers Are Traitors to Cause

"I hold in very low esteem any man who attempts to hold up the nation for high profits in this time of stress. He is in the highest degree an undesirable citizen, for he is fomenting discord and discontent in our ranks just as surely as if he were an emissary of the Kaiser. And he is a traitor to the cause and interest of other men in the industries, for he is sowing for them an evil crop of distrust and suspicion. Let me say that if this unrest is to be stayed, then the owners of the industries must subordinate their individual advantages to the common good by eschewing excessive profits and sharing with their men some of the proceeds of their good fortune. The nation will not submit to extortionate profits, and unless manufacturers meet this issue in a patriotic and sacrificial spirit we can look forward to a very considerable increase in the excess profits tax, or to a more determined and detailed Government control of the processes of business.

"We are engaged in a war that will tax to the utmost our resources, our courage, our determination. We owe it to each other that no seed of distrust, of disloyalty, to the cause be sown through selfish or ill considered acts, for we must meet this trial not only with the inspiration of a high cause defined by a great and enlightened leader, but we must meet it with the cohesive force of a common and universal aim—Victory."

Officers Elected

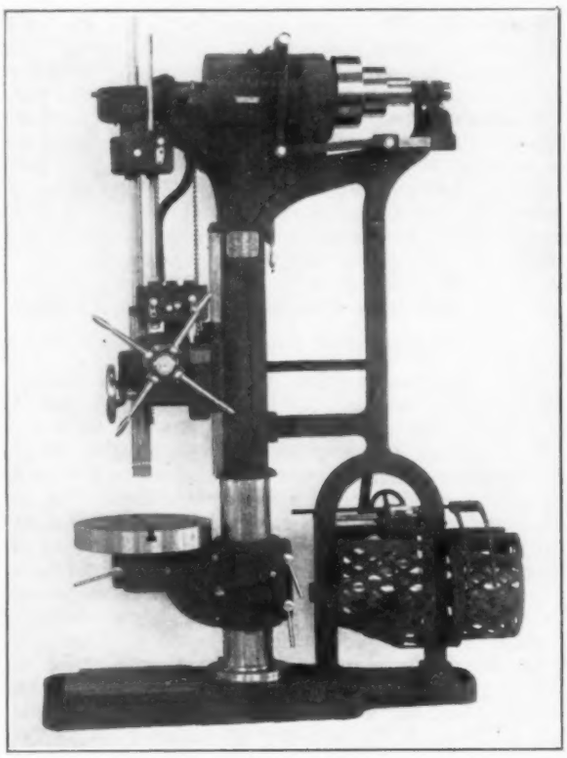
About 300 business and professional men listened to Mr. Piez with close interest. His public utterances have been few since he undertook the management of shipbuilding. Addresses were also made by Governor Goodrich of Indiana and Charles W. Jewett, Mayor of Indianapolis.

Officers and executive committeemen of the Indianapolis branch of the Metal Trades Association were elected as follows: President, Alfred Kauffmann; vice-president, H. G. Myers; treasurer, L. M. Wainwright, all of whom served in the same capacity last year; committeemen to serve two years, D. S. Brooks, Frederick Hoke and Robert H. Hassler. The district committee of the association consists of J. E. Johnson, Muncie; John G. Wood, Anderson; A. G. Seiberling, Kokomo; O. B. Iles and George M. Dickson, Indianapolis. Executive committeemen who have another year to serve are George O. Rockwood, Harvey G. Shafer and W. D. Oakes.

The plant of the Berry Iron & Steel Co., St. Joseph, Mo., was almost completely destroyed by fire March 18, the loss being about $75,000. The foundry had been working on Government contracts, and the fire is attributed to incendiarism. G. D. Berry, president of the company, announces that the plant will be rebuilt at once and its capacity increased.

New Weigel Drilling Machine

The accompanying illustration shows a 21-in. sliding head vertical table drilling machine, a recent product of the Weigel Machine Tool Co., Peru, Ind. The manufacturer calls attention to the arrangement for the gears, which are placed in oil tight boxes. The gearing on the head is covered by housings cast integral with the head. The base of the machine



The Gears of This Vertical Table Drilling Machine Are Placed in Oil-tight Boxes and the Gearing on the Head Is Covered by Housings Cast Integral with the Head

has an oil pan extending entirely around the outer edge. A slot is provided in the front and rear to facilitate moving the machine when it is placed solid on the floor. The table arm is raised and lowered by a rack and pinion actuated through a worm and worm gear. Eight feeds are provided for each spindle speed, with the changes obtained by means of sliding gears. The operating levers for the friction quick return are placed in the form of a pilot wheel consisting of four levers, any one of which engages or discharges the feed at will. The machine can be equipped with a friction tapping attachment. This attachment is placed directly on the spindle and has a reverse of 2 to 1 for backing out the tap.

Less Current Consumption in Making Electric Steel

Because of the growing scarcity of electric current, an investigation was started by Ernest Humbert, a prominent electrical engineer and metallurgist, to determine the possibility of melting scrap in an electric furnace with an amount of current less than usual. The blast was used first on oily turnings and the saving in current was about 30 per cent. Coal and coke were then tried with practically the same saving. The result of Mr. Humbert's experiments has been their incorporation in a patent U. S. No. 1,252,443, which gives complete details. One of the claims is as follows:

> Producing a metal containing a certain percentage of carbon by introducing into an arc furnace a substantially complete charge which contains an excess of carbon and which is at least in part solid, striking an arc from an electrode to the solid material and introducing a current of air alone into the solid material to combine with the excess of carbon.

The same process can be used to make low phosphorus pig iron, Mr. Humbert says.

A Center Drive Car Axle Lathe

For machining axle forgings as well as finishing axles that have been partially machined, the Niles-Bement-Pond Co., 111 Broadway, N. Y., has brought out a center driven lathe. In addition to enabling quantity production of axles to be obtained, it is also possible to turn wheel seats and journals on both ends of the axles simultaneously.

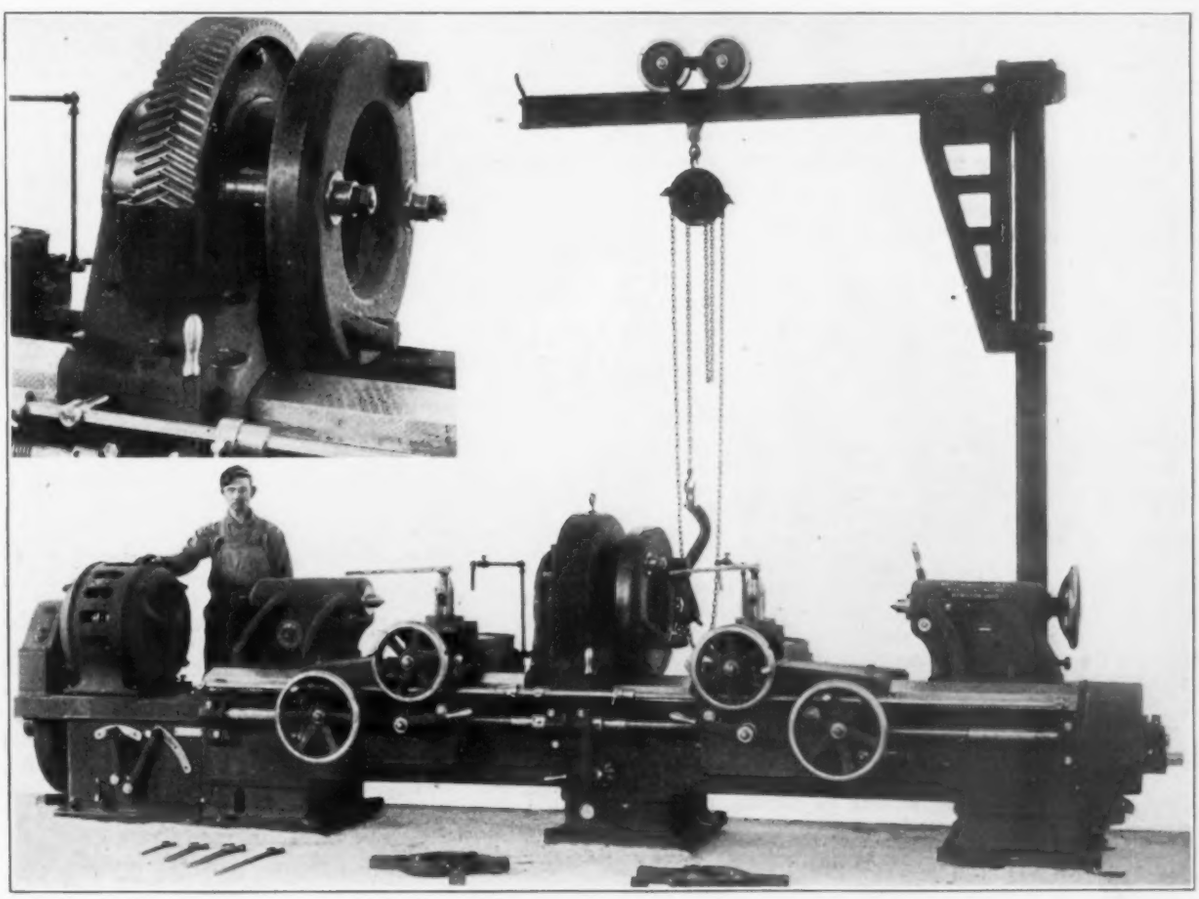
The bed which is of rigid construction is reinforced by 8-in. box section cross girts and supports the ways on which the carriage travels. A wide flat way at the back of the bed and another at the front having a V cross-section are provided for the carriage. The latter track has an angle of 15 deg. at the back, which is relied upon to present a thrust surface at right angles to the combined forces of the tools, thus eliminating any tendency of the carriages to climb while heavy cuts are being taken, and also compensates automatically for the wear of both the carriages and the bed. The front of the track makes an angle of 70 deg.

The center driving head is adjustable along the bed, and may be clamped in any desired position by six large bolts. It incloses the main driving gear, which is of the large steel herringbone type and meshes with a pinion that is carried between bearings in the head. The cover for the main driving gear serves as an oil reservoir in which the gear runs. The axle itself is driven by a steel equalizing driving plate, having lugs cast integral with it. These lugs engage both ends of the double driver dog, and it is pointed out that with this arrangement, crooked or irregular axles may be machined without producing bending strains.

The lathe is equipped with two carriages, which are held down by clamps for their full length and are adjustable to the front and rear vertical surfaces of the bed by taper gibs. At the front of the carriages two clamps are provided, one for fastening the carriage to the bed when turning against shoulders is being done or the end of an axle is being faced, this clamp being operated by a bolt at the top of the carriage, while the other clamp is located under the bridge and is relied upon to decrease the likelihood of the carriage lifting during the burnishing operation. A right and left hand screw which is positively driven by gearing provides power longitudinal feed for the carriages. This is secured by split nuts on the carriages, which engage with the leadscrew and open automatically when the carriages come in contact with set collars on the tappet rod at the front of the machine. Wipers are attached to both carriages to remove all chips and dirt from the shears, and are fitted with felt pads to supply the surfaces with a continuous supply of clean lubricant. The aprons are of the standard double-wall construction, all of the mechanism, except the operating levers, is completely inclosed and all shafts are supported at both ends. The three feed changes for the carriages range from 1/16 to 3/16 in. and are secured by a set of inclosed gears located at the right end of the bed. The lever which controls the engagement of the different feeds is placed at the center of the machine where it can be readily reached by the operator. Hand traverse on the bed is provided for the carriages, and the tool slides have hand cross feed.

The axle, which may be as long as 111 in., is carried on dead centers mounted in two heavy tailstocks that are adjustable along the bed. Four large anchor bolts are relied upon to hold them in the desired position, but as an additional precaution against slipping, a pawl is provided which engages a rack cast in the bed. Taper gibs at the front and back of the bed are provided to permit alignment of the spindles, and a handwheel adjustment of 9 in. is supplied for the spindle of the right tailstock, the left one being fixed.

All of the standard driving arrangements can be provided for the lathe, it being possible to drive by a three-step cone pulley, which in connection with a two-speed countershaft provides six speeds, ranging from 16 to 48 r.p.m. If a single-pulley drive is employed, a speed box is used, and this arrangement gives one addi-



A Large Centrally Located Herringbone Gear Is Employed in the Drive to the Lathe for Machining Axle Forgings and also for Finishing Partially Machined Axles Which Are Handled In and Out of the Lathe by a Special Crane Equipped with a One-Man Hoist

tional rate, although the maximum and minimum speeds are the same in all cases. If desired, a constant-speed motor for use on alternating-current circuits can be substituted for the single-driving pulley, in which case a friction clutch is employed to start and stop the machine. This arrangement is also employed for the single-pulley drive. Where only direct current is available, an adjustable-speed motor having a range of 3 to 1 is mounted on a base plate attached to the left end of the bed and geared directly to the driving shaft.

For handling axles in and out of the lathe, a crane, such as is illustrated, can be furnished at a slight additional cost. The hoist employed is one of the one-man type, and is furnished with a convenient means for gripping the axle.

DILUTION OF LABOR

Satisfactory Results of Employing Women and Unskilled Men

WASHINGTON, April 2.—Some interesting data concerning the effect of dilution of labor in the national shell factories of Great Britain are contained in a report prepared by the British Ministry of Munitions and made public through the United States Department of Labor. The statistics embrace surprising evidence that in certain lines of work women and untrained men are able, with very little instruction, to attain an output much greater per employee than highly skilled workmen. They also indicate that the proper job for the skilled mechanic in establishments where repetition processes are the rule is that of supervisor and instructor rather than manual worker.

Experience has frequently shown how uneconomical it is to employ a highly skilled mechanic on work of a repetition nature, says the report. Always supposing that there is no conscious restriction of output on the man's part, his pride of craftsmanship impels him to spend time in producing a finish and an accuracy greater than the nature of the work demands. Moreover, as a rule he does not take kindly to the easy and fool-proof methods of manufacture which give no opportunity for the use of his experience and trained intelligence. It is to the national interest, and should be to the man's own interest, that he should be employed on work which really needs his skill, and which cannot be done without it.

The unskilled man or woman, when introduced to a job, has nothing to unlearn; and provided that the operations have been laid out systematically beforehand, as they should have been, the unskilled operator has very little to learn. In view of what has been said above, therefore, it is not surprising that with proper tools and supervision he will frequently, and one might perhaps say generally, attain an output which the skilled supervisor himself could not equal. It must not always be assumed that this is discreditable to the skilled mechanic. It is, however, always to his credit that he can train unskilled labor to such a degree of efficiency, and it proves conclusively that his proper place is that of a charge hand rather than that of a machine operator.

The following case, recorded by one of the national shell factories, may be mentioned as one example out of many where a markedly greater output has resulted from the substitution of unskilled labor for skilled labor. The factory in question is producing 9.2-in. Mark IX H. E. shell, and the boring of the interior of the shell is done in three distinct operations, namely, rough-boring the body, rough-boring the head, and finish-boring the complete shell. The work is done on Lang boring lathes, and the appended table gives the comparison between the output of skilled men and women under identical conditions.

It will be seen that whereas the complete boring of the shell required 3.16 machine-hours when done by skilled men, it was accomplished in 3.6 by women after only one week's practice, and within two or three months the women had reduced the time to 1.25 hours, thus increasing the output to two and a half times its previous figure.

Several months ago, as a result of the visit of officers of the ministry to the factory in question, 73 skilled men were enrolled as war-munitions volunteers and transferred to other works. Unskilled and semi-skilled men to the number of 133 were released, and the places of all the above men were taken by females.

Figures presented in this report show changes that have been brought about in a period of nine months in shops producing 9.2-in. shells, 4.5-in. shells and copper bands by the application of the dilution principle. In the case of the 9.2-in. shell shop during the nine months' period, the number of skilled workmen was reduced from 123 to 61, the number of women employed was increased from 79 to 137 and there were added to the working force 17 discharged soldiers who were not skilled workers, and 10 boys. The force was thus increased from 202 to 225 and the shell output per month rose from 950 to 2369, an increase per employee from 4.7 shells to 10.5 shells. Thus, with a decrease of 50 per cent in the number of skilled mechanics employed and a total increase in force of only 11 per cent, the shell output per month was increased 149 per cent and the output per employee 123 per cent. In the case of the 4.5-in. shell shop, a reduction in the force of skilled mechanics of 49 per cent and an increase in the women employed of 48 per cent, making a total increase in the working force of 17 per cent, resulted in an increase in the shell output per month of 58 per cent and in the output per employee of 35 per cent. Similar results were secured in the copper-band shop.

Notwithstanding the fact that the proportion of women to the total employees in the 9.2-in. shell shop is now 61 per cent, dilution is still proceeding and it is confidently anticipated that an increase of 30 per cent in the output of shells will be obtained with a still higher proportion of women and discharged soldiers. This expectation is predicated upon the experience in another 9.2-in. shell factory where women operate the whole of the machines and do all the manual work, the proportion of women to total employees being 90 per cent, and the output of completed shells per employee 18 as compared with 10.5 in the shop above referred to.

Comparative Output of Skilled Men and Women

Operation	Average Output per 10-Hr. Shift: Skilled Men	Women	
Rough-boring parallel part of body	8	First week	7
		After 6 weeks..	17
		After 10 weeks.	20
		At present	24
Rough-boring head to blend with body	11	After 1 week...	8½
		After 6 weeks..	14
		After 10 weeks.	18
		After 14 weeks.	20
		At present	24
Finish-boring shell	10	After 1 week...	10
		After 5 weeks..	14
		After 9 weeks..	16
		At present	24

In the 4.5-in. shell shop of the national factory under consideration, the machines were not originally designed for shell work and are in a bad state of repair. Moreover, during the period under review over 15,000 shells of exceptionally hard steel have had to be made, otherwise the increase of output would have been greater even than it has been.

The facts here presented, the report says, should be of material assistance in convincing engineers that there is nothing incompatible in the apparently contradictory duties laid upon them in the national interest, first to increase the output of munitions, second to release every skilled and ablebodied man for work which only such men can do, and last but not least important, to find remunerative occupation for discharged soldiers "broken in our wars."

Granby Consolidated Mining, Smelting & Power Co., Nanaimo, B. C., is proceeding with plans for installation of a coal plant. About $200,000 will be spent in the construction of docks, coal plant and coking ovens.

Fig. 1—First step in construction of gigantic metal-planing machines built largely of concrete by Amalgamated Machinery Co., Chicago

Metal Planing Machines of Concrete

Bearing Parts of 92-Ft. Platens and 184-Ft. Beds Cast in Sections to Machine Beds of Gun-Boring Machines

BY CHARLES LUNDBERG

This article, with accompanying illustrations, is intended to make clear the manner in which the Amalgamated Machinery Co., Chicago, constructed the huge planing machines to which strength and mass were given by reinforced concrete, reference to which was made in THE IRON AGE of Jan. 31. At that time two machines were under construction. Subsequently their number was increased to four.

Having successfully designed and built shell-boring and turning machines which utilized bars for ways, which had babbitted bearings and parts held in alignment by a babbitting process and which could be assembled in a few hours by a small crew of men, for all of which he was given recognition by the Franklin Institute of Philadelphia, Lucien I. Yeomans, whose early mechanical training was obtained in the shops of the Brown & Sharpe Mfg. Co., turned his attention to machines for boring heavy ordnance, the largest guns, in fact, which are made. The gun-boring machines, in their manufacture require planing machines of sufficient size to plane their ways, and because of the time required to build planing machines of such size entirely of metal, Mr. Yeomans conceived a combination of concrete, cast-iron and steel, the bulk of material being reinforced concrete.

A few dimensions of the huge machines, and the record time in which they were built are illuminating. The length of the bed is 184 ft. and that of the platen is 92 ft. The width of the concrete bed is 6 ft. and that of the platen 5 ft. The over-all width of the concrete foundation or sub-base is 10 ft., except at the housing, where it widens to 17 ft. The thickness of the platen is 13 in. The concrete cross rail is 4 ft. square. The top of the hous-

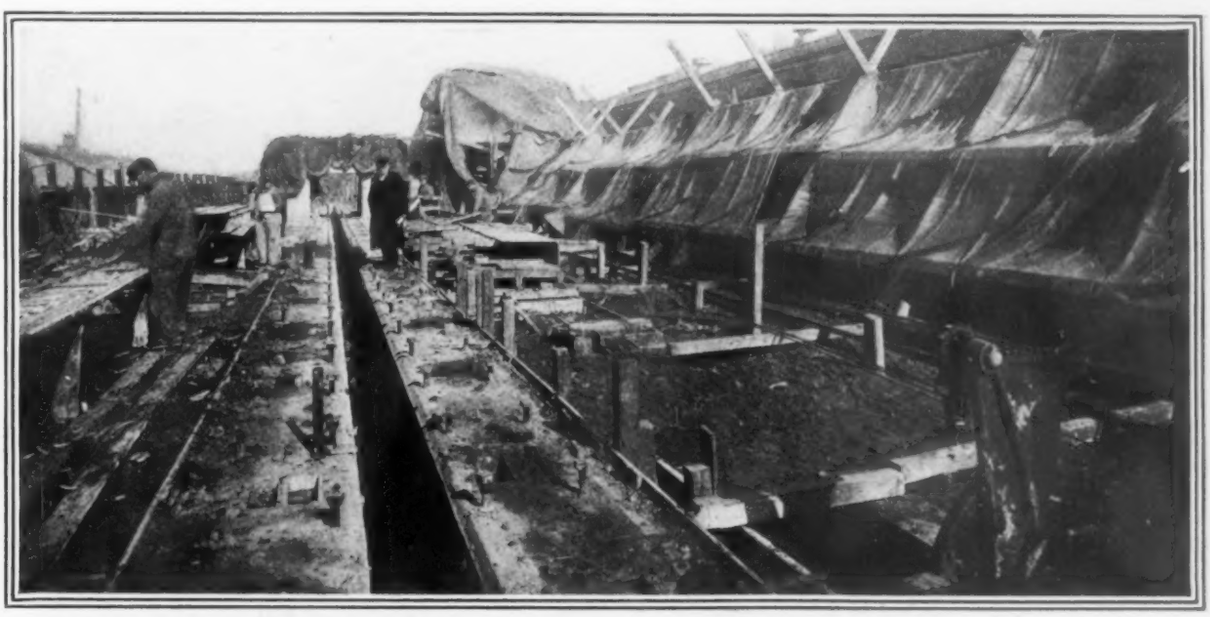


Fig. 2—Concrete bed, 184 ft. long, in the center of which is the concrete housing. Under canvas at the right is Machine No. 1 which was further along in construction. Projecting from the top of the bed are anchor bolts for holding the sectional way castings. Small pockets in top of bed make room for lugs at bottom of way castings, the lugs being used in lateral adjustment

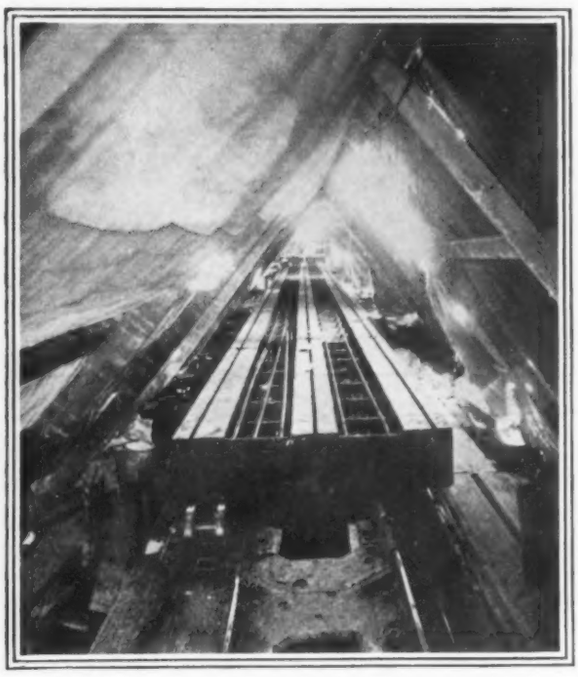


Fig. 4—Platen sections in place before hollow parts have been filled with concrete. The tent has been contracted until the quarters are close, but a warm temperature was maintained by salamanders

ing is 9 ft. 6 in. above the bed, the housing being 7 ft. 4 in. long at the top and 20 ft. in length at its base. The housing walls are 30 in. thick. The bed, through the entire length of which runs a trench 14 in. in width, is 8 ft. 6 in. deep. The ways, one of which is flat and one V-shaped, are in sections, as is the platen, and none of the sections of either are machined on their ends. Both are of cast iron. The complete machine contains 250,000 lb. of metal, 13,500 cu. ft. of concrete, 34,000 lb. of reinforcing steel, and its total weight is 1,600,000 lb.

Steam Shovel Excavates for Foundation

A steam shovel began excavating for the foundations of two of the machines Dec. 24, and the first one was set in motion March 9. The first step in actual construction was pouring an 18-in. footing of concrete throughout the length of the big excavation. While the excavating was in progress, poles were raised to support a great tent which had been bought for the purpose. As shown by the halftones, the severe wind and snowstorms of the past winter played sad havoc with the canvas. At times tons of snow rested upon it and gales made rents in it. Constant patching and overlapping caused its gradual contraction until finally it covered the work, supported by scantling, and more resembled a tarpaulin than a tent. Naturally, during the severe weather, the work of Ed. Montague, the works manager, and his crew of men was greatly retarded, and the completion of the first two planing machines was delayed. Salamanders were used to keep the temperature under the canvas at a point that prevented the concrete from freezing. Work at high pressure was carried on night and day, and here it may be said that Mr. Yeomans worked both night and day. Meals were prepared in an improvised kitchen at the plant.

Jack Screws Adjust Ways Vertically

Reference to Fig. 2 will explain the form of the concrete foundation or bed of the machine. Clearly shown in the cut are 1¼-in. anchor bolts which hold the way castings to the bed, the ways, as already stated, being in sections, and both sides being cast in one piece. A good idea of the way castings is obtainable from Fig. 3. In each section are four rows of 1-in. jack screws, making 64 in each

Fig. 3—Here are shown the housing of two machines and sections of the way castings being placed on Machine No. 1. Note numerous jack screws for vertical adjustment and oil pockets for lubrication of ways. To the left stands Ed. Montague, works manager of the Amalgamated Machinery Co. The picture shows how the tent suffered from wind and snow storms

section. These are for effecting vertical alignment, their ends impinging on cast-iron cupped washers to obviate any tendency to grind into the concrete when being turned. From the bottom of the sections extend 3-in. lugs against which pressure may be exerted by screws, thus effecting lateral adjustment. The width of the way castings is 4 ft. 3 in., their depth 10 in. and their length is approximately 12 ft. On each side of each section are two oil pockets, which are connected by ½-in. by-pass pipes, and which contain flat and V-shaped rollers mounted on spring bearings to provide for lubricating the ways. The ends of the way castings are not machined; in fact, they are not joined, a space of about ¾ in. between them being packed with oakum to prevent the leakage of oil.

As appears at once, a most important consideration embraced the correct alignment of the ways. More than one method was contemplated, but the work was finally accomplished by the use of a straight edge to obtain approximate accuracy, after which a precise leveling instrument was used by experts who had taken care to get the most accurate instruments obtainable. Assistance in this direction was obtained from D. L. Derrum, works manager of Winslow Brothers Co., Chicago, formerly in charge of the shell shop of the Canada Cement Co., Montreal, and Prof. Berger, of Northwestern University. The result of the methods employed was accuracy to within 0.002 in.

Fig. 5—Top of 92-ft. platen after the hollow spaces have been filled with concrete. The sections of the platen were planed top and bottom to a master block. Only the T-slots were planed by the machine itself

Ends of Platen Sections Not Machined

The sections of the platen vary in length, the head end section being 9 ft. 3½ in., the center sections 9 ft. 11 in. and the tail-end section 10 ft. 11½ in. The lengths of platen, way and rack sections are so designed that joints can never be parallel. The platen sections are machined top and bottom only, uniform thickness being insured by the use of a master block in the planing operation. The sections are strongly ribbed, but cast hollow, as shown in Fig. 4, except where the casting rises to the top level at each side and in the center, which allows for three T slots. These are shown in Fig. 5. The ends of the platen sections on their under side are staggered, with a 20-in. offset, except at the head and tail ends. Reinforced rods were laid in the hollow portion of the sections after which

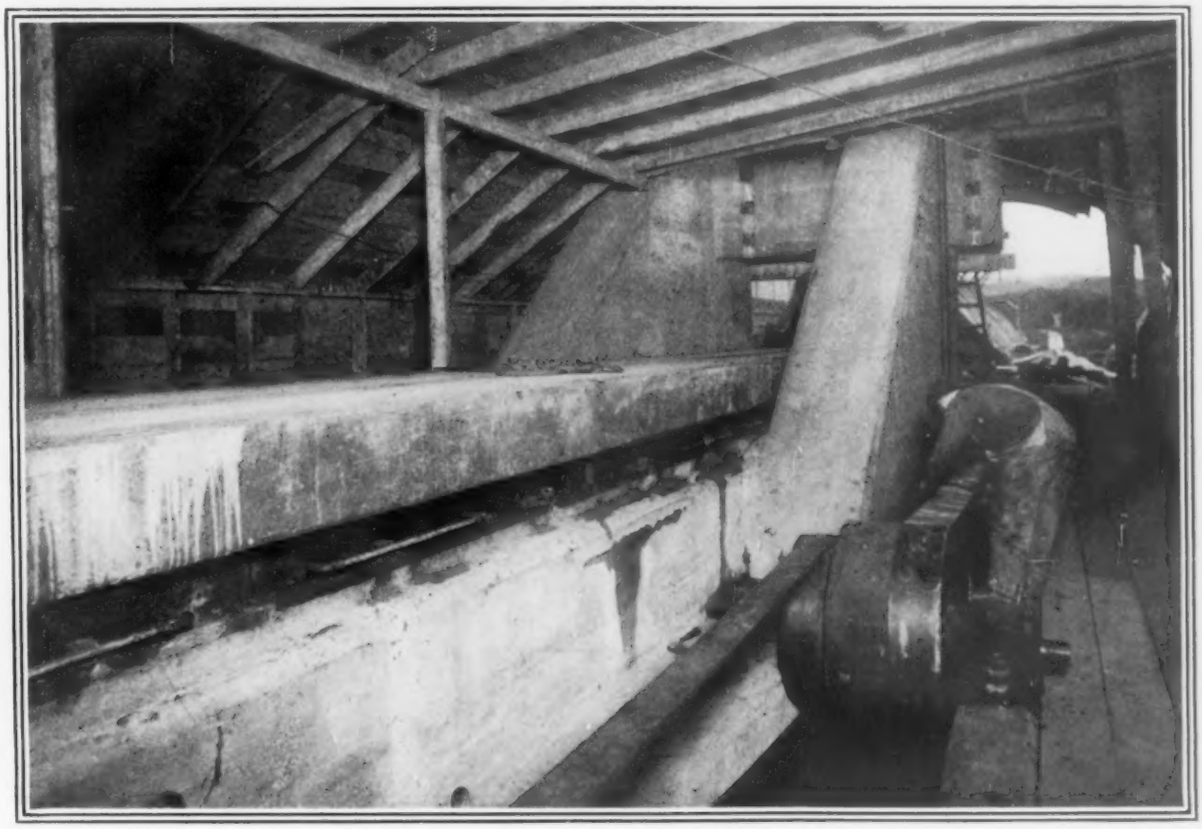


Fig. 6—Back end of the housing and part of the driving mechanism. The platen here extends under the cross rail. Under the platen will be observed the by-pass pipes connecting the oil wells in ways. The concrete cross rail is 4 ft. sq. At its base the housing is 20 ft. in length, with walls 30 in. thick

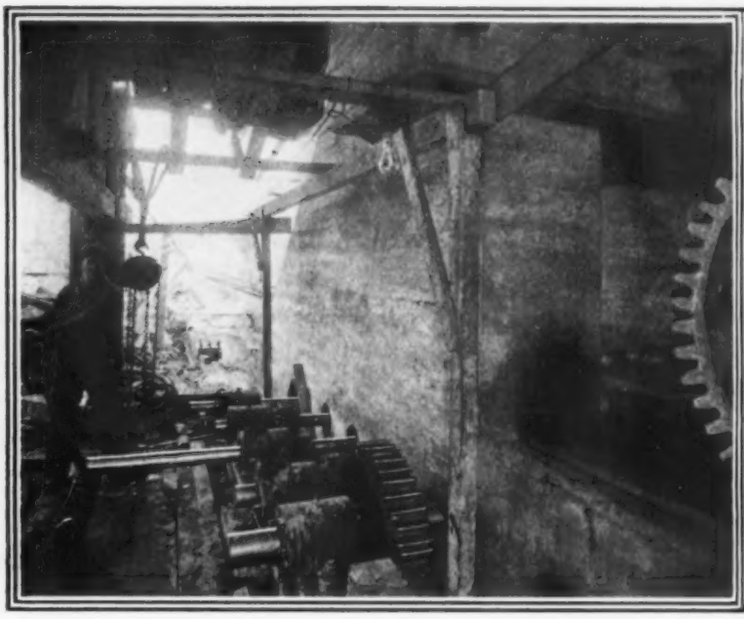


Fig. 7—A partial view of the front side of the housing, showing a part of the reduction gearing for driving the machine. To the extreme right may be seen a portion of the bull gear which drives the platen. The heavy cast-iron face of the cross rail is not yet in place

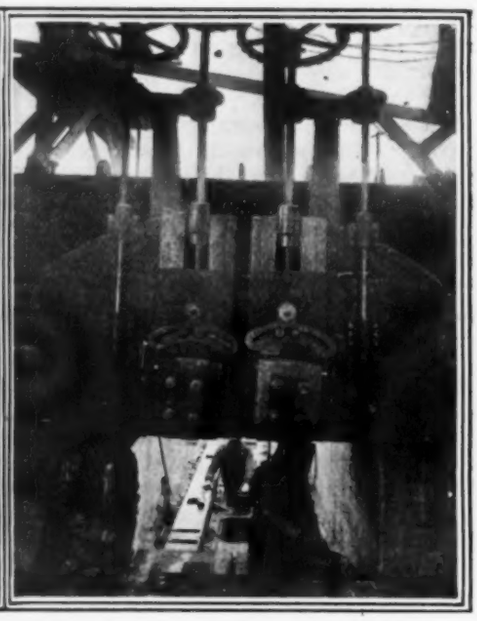


Fig. 8—Casting weighing 24,000 lb., on which are cross slide and vertical slides carrying heads which have a vertical feed of 16 in. Hand wheels for feeding are over the cross rail

concrete was poured, making of the platen a monolith of iron, steel and concrete. The several sections are held together by the rack on the under side, this being both bolted and doweled to the castings. Some of the dowel holes are drilled in the shop and others after a piece has been placed on the ways and pushed against the adjoining one.

The rack, which plays an important part in holding the sections of the platen together, as well as in communicating motion to it, is of cast steel, has 3-in. circular pitch teeth, and at its base is 18 in. in width. It is planed at the base to insure proper meshing with the bull gear which drives it.

Hand Feed from Cross-Head Top

A steel bar attached to the edge of the platen carried adjustable dogs which strike a trip actuating a pneumatic reversing device, which changes the motion of the platen by shifting the driving belts. The forward speed is 20 ft. per min. forward and the reverse about 60 ft. The 4-ft. concrete cross rail is faced by a heavy-ribbed casting, which, with its parts, weighs 24,000 lb. It is both hung and bolted in place by 12 bolts, on which, in turn, is mounted the cross slide, and the vertical slides for the tool holders. The feed, both horizontal and vertical, is by hand, and controlled by the four hand wheels partly shown in Fig. 8. Micrometer dials are attached to the feed-control shafts. Over the housing is a bridge on which the operators stand. The housing is inclosed and eventually the other parts of the machine will be, for the purpose of protecting both machine and operators from the elements. The cutting tools and their holders are substantial, a feature of each tool holder being that it carries two tools in tandem.

Power for driving the machines is supplied by two 40-hp. variable-speed motors, one on each side,

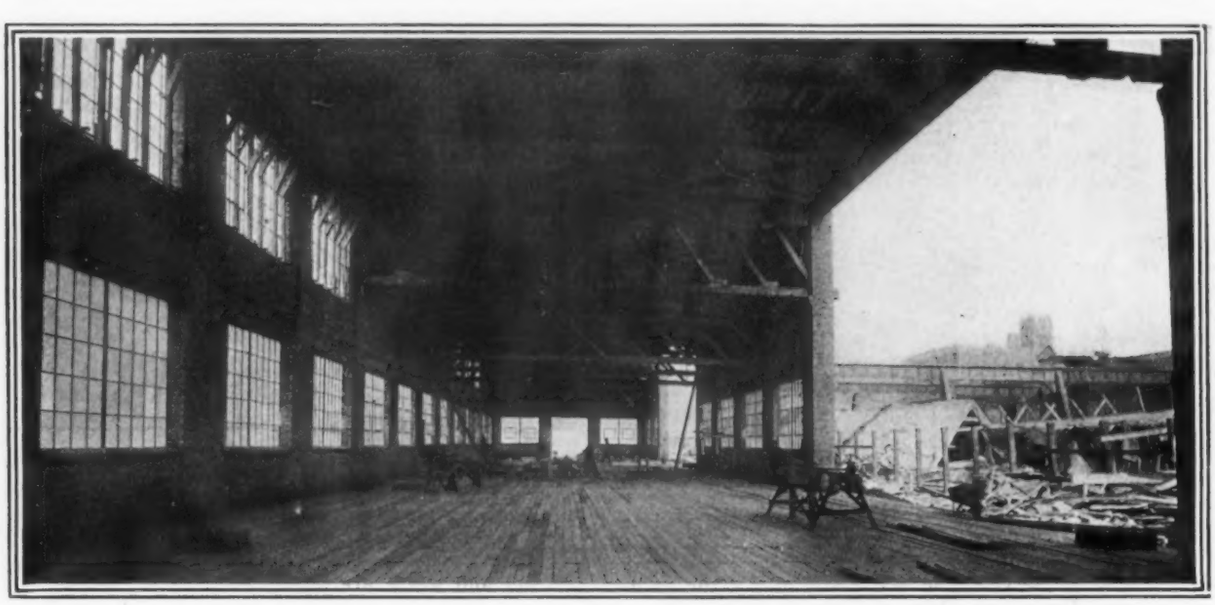


Fig. 9—Building erected in record time in which the gun-boring machines whose beds have been planed will be assembled. The large openings in the side are 40 ft. in height, and 50 and 54 ft. in width. Opposite one is a crane runway which will enter the building, and a similar runway will be erected opposite the opening in the foreground. Running longitudinally in the building, will be a crane carried on a runway 12 ft. in height

one driving the platen forward, the other supplying power for its quick return. Some idea of the driving mechanism may be obtained by referring to Figs. 6 and 7. On a jack shaft driven by a motor is a flywheel and another pulley which drives a tight and loose pulley on the first reduction gear shaft of the forward drive. In turn, power is transmitted to second, third, fourth and fifth reduction gears. The sixth carries the bull gear which meshes in the rack.

Devise Special Machine for Facing

The machine, the construction of which has been sketched, will be used in the manufacture of gun-boring machines and the boring of propeller shafts up to 80 ft. in length. A gun-boring machine 70 ft. in length will consist of three sections, the head end being 30 ft. and the two others 20 ft. The head stock is cast integral with the head end of bed. The ends of these sections require facing, and to accomplish this Mr. Yeomans devised a special machine, the principal parts of which consist of a huge casting, and a large gear across the diameter of which, on one side, is a cross slide carrying two heads. The entire machine is lowered by crane on a jig that is placed on the end of a bed section. A part of the casting and the large gear projects downward over the end of the casting, and as the gear revolves, being driven by a small gear, the two cutters face off the casting, the feed being automatic. The weight of this machine is about 10 tons.

In Fig. 9 is shown the interior of the 50 x 250-ft. building that has been erected for the assembly of the big gun-boring machines. Most striking about the structure are the two large openings for the admission of the big castings after they have been planed. Both of these openings are 40 ft. in height; one is 50 ft. wide and the other 43 ft. Two 25-ton cranes enter the building on runways from the yard, only one of which is shown in the illustration. The runways are 25 ft. in height. In the building, but not shown, is a 5-ton crane supported on a runway 12 ft. in height which runs the length of the building.

Shell Machines Assembled in Seven Hours

Remarkable as the planers and the other features of the plant are, they are no more impressive than the shell-boring and turning machines designed by Mr. Yeomans and constructed by the Amalgamated Machinery Co. These machines embrace castings to which a machine tool is hardly touched except to drill a hole, perhaps, the bearings being babbitted and the ways of steel bars which have been turned and ground. The bars or ways and other parts, after being aligned by means of large jigs, are secured in place by a fusible metal having a load value of about 4000 lb. per sq. in., and which expands in cooling. A skilled crew assembled one of these machines in 7 hr., and seven a day have been turned out, with ten a day in sight.

The gun-boring machines are made in varying lengths of bed, but in three sizes of spindle and swing. A size designated as No. 26 has a 6-in. spindle and is of 27-in. swing; No. 46 has an 8-in. spindle and 39-in. swing, and No. 56 has a 10-in. spindle and 48-in. swing. The equipment includes steady-rests, bar guides and boring carriage.

Garrett P. Serviss, the scientist and author, will address the New York Chapter of the American Association of Engineers at its next meeting on Wednesday, 8 p. m., April 10, at the Hotel McAlpin. His subject will be: "The Glory of the Engineer."

Guarding Against Fire and Foe

As a defense against incendiary fires and sabotage the following statement of the organization and routine as worked out by the International Arms & Fuze Co., Bloomfield, N. J., has been issued by the New Jersey Committee of '76, 201 Essex Building, Newark, N. J.:

1. A military guard consisting of a captain, two lieutenants, three sergeants, with three shifts of watchmen and a total of some 60 guards.
2. An officer of the day appointed from a roster made up of heads of departments to serve 24 hours and not to leave the premises during his tour of duty. The officer of the day inspects at least three times a day, one of these inspections being between midnight and dawn.
3. Civilian watchmen making the rounds continuously, using watchmen's clocks and key stations and following a predetermined route. Watchmen clock cards are examined every day by the officer of the day to see that these watchmen have been faithful.
4. A fire patrol, the fire chief and three subordinates under him. This fire patrol is on duty day and night and patrols the factory looking for bad risks, examining the fire apparatus to see it is in order, refilling the fire extinguishers and making suggestions about better fire protection or decreased fire risk.
5. Secret service operatives in the plant engaged as ordinary workmen and not known to be otherwise by their superiors or by the people working about them. We have some 60 odd such employees whose reports come in daily and are laid before me. These operatives are from two different agencies, and the one checks against the other.
6. A neighborhood guard consisting to some extent of people who live within the vicinity of our plant and who are obligated to report to us any suspicious persons working about the place, and who cooperate in the method of guarding the plant.

The company keeps the plant lighted both day and night and the grounds lighted so as to make the task of detecting intruders easier. Auxiliary citizens' committees of a secret nature report regularly, and operatives employed by the Department of Justice of the Federal Government are on duty in the plant.

The following extracts from the principal precautionary rules in force at the United States navy yards, which have been issued by the New Jersey Committee of '76, 201 Essex Building, Newark, N. J., afford good hints for protecting any factory from fire:

1. No material shall be allowed to remain within 15 ft. of a hydrant. Where hose is attached at all times for protection, to either an outside hydrant or an inside hose nipple, said hose must be kept carefully stowed on a reel ready to be let out the instant after the valve is opened. Hose must not be stretched out on the floor at night.

2. Smoking will not be allowed in the shops except in such places as the commandant or captain may specifically indicate.

3. None but safety matches will be permitted in the yard or shop.

4. To insure from fire from spontaneous combustion, workmen must not leave matches in their working clothes, oily rags, grease, waste or other dangerously inflammable material when quitting work for the day. Carelessness in this respect will be sufficient cause for discharge of the offender.

5. Employees are required to cleanse their working clothes from time to time, keeping them comparatively free from oil, grease, etc., so that when stowed away there shall be no danger of spontaneous combustion.

6. Do not stow anything on or within one foot of a steam pipe or radiator.

7. Clothing and working clothes must be kept only in the rooms provided for that purpose and be loosely hung.

8. Oil and waste are to be kept only in authorized places.

9. Oily waste must be kept in metal receptacles and away from inflammable material.

10. In order to protect against danger from fire an-

to promote economy, it is directed that paints, oil, turpentine, alcohol, etc., shall not be kept for use in any house, shop, storeroom, engine room, office or other similar place, except the paint shops or dispensary.

11. Foremen requiring paint, turpentine, putty, alcohol, etc., shall obtain it as required on suitable stubs from the master painter and shall return the brushes and paint pots before the close of work every day.

12. The only exception to this order is for such foremen as require the constant use of shellac. This shellac shall be obtained from the master painter already put in receptacles, provided for the purpose, which shall be issued by the master painter with fresh shellac.

13. Where shops are provided with fireproof lockers, materials needed for immediate work may be stowed in such lockers.

14. Unslaked lime and inflammable materials will be stored only in those places designated for the purpose.

15. Care will be taken that at all times when it is necessary to use hose, either for drill or for use during fire, it shall not be replaced upon reels or stowed on shelves until it has been thoroughly dried.

SCREW THREAD COMMISSION

Bill Before the House to Establish a National Standard of Supreme Importance

WASHINGTON, April 2.—A commission of five members, whose duty it shall be, within a period limited to one year, to standardize screw threads of all kinds, the resultant standards to be promulgated by the Secretary of Commerce for use by the Government and by private manufacturers, is provided in a bill introduced by Representative Tilson, of Connecticut, which has just been reported to the House of Representatives with a favorable recommendation by the Committee on Coinage, Weights and Measures. The favorable report upon the bill was preceded by an extended hearing at which the witnesses included the author of the measure; Dr. S. W. Stratton, director Bureau of Standards; Rear Admiral W. Strother Smith, Bureau of Construction and Repair, Navy Department; John G. Utz, supervisor of inspection, military truck production section, office of the Quartermaster General, War Department; F. O. Wells, president Greenfield Tap & Die Corporation, Greenfield, Mass., and Herbert Chase, assistant secretary of the Society of Automotive Engineers. There was also placed in the record a strong plea for the enactment of the bill forwarded by Secretary Calvin W. Rice of the American Society of Mechanical Engineers. The early passage of this legislation was urged by all the witnesses, several of them declaring that the entire munition production program of the United States had been seriously delayed through lack of standardization and especially because of the failure of the various Government departments and the private manufacturers to reach an understanding as to screw-thread tolerances.

Personnel of the Commission

The bill, as reported, provides that the commission shall be composed of the director of the Bureau of Standards, who shall act as chairman, one commissioned officer of the Army and one of the Navy, the remaining two members to be appointed by the Secretary of Commerce, one of whom shall be chosen from nominations made by the American Society of Mechanical Engineers and the other from nominations made by the Society of Automotive Engineers. It will be the duty of the commission to ascertain and establish standards for screw-threads, which shall be submitted to the Secretaries of War, the Navy and Commerce, for their acceptance and approval. Such standards when thus accepted and approved "shall be adopted and used in the several manufacturing plants under the control of the War and Navy Departments, and, so far as practicable, in all specifications for screw-threads in proposals for manufactured articles, parts or materials to be used under the direction of these departments." The Secretary of Commerce is directed to promulgate such standards for use by the public and to cause the same to be distributed as a public document. The members of the commission are to serve without compensation. The bill imposes no penalties for failure to conform to the standards established, and it is believed that no other consideration is necessary to induce manufacturers to accept the standards than that they have been adopted by the Government and will be enforced as to Government contracts.

Presentment in Behalf of Mechanical Engineers

In opening the hearing on this measure Representative Tilson read a communication from Secretary Rice, of the American Society of Mechanical Enginers, in part as follows:

> An absolutely essential requirement for preparedness, both for war and peace, is standardization. Without it we can not withstand the competition in the peace after the war, a competition which will be terrific if Germany repudiates all her internal debts. What show would America have with labor inflated to $75 a week against a nation with labor at wages one-third our scale, so thoroughly organized and unified, from the emperor down to the children, working as one machine in war or peace, whatever happens to be the necessity? To our minds standardization is the only answer. . . .
>
> I cannot evidence our interest to you and the other committees of the Congress more than by stating that at this moment, in response to the invitation of the authorities in London, our past-president, James Hartness, president of the Jones & Lamson Machine Co., an authority on aircraft work as well as screw threads; Dr. W. F. Durand, another past officer of the society, the former president of the International Engineering Congress in connection with the Panama-Pacific Exposition, the chairman of the Aeronautical Commission appointed by Congress; E. H. Ehrman, whom I think you have met, of the Chicago Screw Co., and other representatives of this society, the Society of Automotive Engineers, the Aircraft Standardization Board, the Bureau of Standards, the Army and Navy, are in London at work on the standardization of all aircraft problems. This is to be followed by a screw thread conference, and General Kenyon's representative, Mr. Bingham-Powell, and Capt. R. J. Durley, of Canada, have informed me to-day that they are sailing next week for this international screw thread conference; in other words, Mr. Tilson, we are doing internationally at this time what you are agitating now to be done in the United States.
>
> There could be no more effective argument of the urgency of this legislation. If our men are willing to risk their lives to go to London in the interest of standardization, we who are at home should surely vigorously undertake the work here.

In explaining to the committee the details of the proposed standardization of screw threads Mr. Tilson, who has had considerable experience in manufacturing and is a recognized expert in ordnance matters, described the technical problems involved and emphasized the importance of the adoption of a schedule of tolerances which would enable the Government by specification to inform every manufacturer of the exact allowance that would be permitted in any job that might be contracted for. He also exhibited diagrams showing the wide variations from standards recently found in the examination of a large number of English screw threads due to the fact that there is no recognized limit of tolerance. At a time like this, he said, it was highly important that the United States and Great Britain should get together on this subject.

Mr. Utz told the committee he had been closely identified with the standardization work of the Society of Automotive Engineers, especially in the work of setting limits on steels, both chemical and mechanical. "The same way," he said, "with our dimensions. The societies of automotive engineers, mechanical engineers, master car builders and electrical engineers have all been a little bit embarrassed when they have arrived at the common subject of screw threads. They are all bashful and hesitate to say 'We are the big society, come to us.' The thing that interested me in this bill was that it recognizes that the Government would be the body that everybody would look to."

Admiral Smith urged the passage of the bill on the ground that it would be of great benefit to the Government in that it would widen its sources of supply. If a certain degree of accuracy were recognized and a definite schedule of tolerance adopted many more

manufacturers would compete for Government work and there would be a cheapening of production and a benefiting of labor.

Voluntary Agreement Not Sufficient

Several members of the committee desired to know why a voluntary agreement could not be reached without the necessity of passing a law on the subject. On this point, however, Dr. Stratton declared very positively that without a law it would be impossible to secure the degree of co-operation that could be speedily attained if the Government would definitely take the lead by incorporating standards in a specific statute. "The matter of tolerance," he said, "is very acute at present, not only in connection with screw threads, but in connection with the gages for munitions. In fact, the screw threads enter into munitions a great deal more than you would think. The matter was not so important when both the Army and Navy confined very largely their construction work to their own shops, but to-day when these things are built all over the country and must be assembled either in private shops or at assembling places, the question of tolerance becomes very important indeed. I think we all agree that the tolerance should be established and just as quickly as possible. The question is as to the methods. We are erecting a building at the bureau which will be devoted entirely to the standardization of munitions, of which this is one of the most vital. I think the legislation would give it a tremendous momentum and give to it a force that it would not have in the other way."

Mr. Wells described the efforts of the past six years by the American Society of Mechanical Engineers through a committee of nine to establish the tolerance on screw threads. Jealousies developed, he said, and although tentative standards have been put in printed form he did not believe they could be adopted without some legislative sanction. It was hard work to get the screw makers, the tap makers and all others interested to agree, but the Government could easily settle the matter by a simple law on the subject.

Mr. Wells described to the committee a visit he made to Washington in 1914 to ascertain what the Army and Navy were doing in the recognition of tolerances, and found that no tolerances whatever were specified on any of the blue prints for guns or munitions. It was therefore necessary to put all such work together by hand with laborious fitting. Finally, the importance of tolerance was recognized and before the United States became involved in the war both Army and Navy Departments had their draftsmen busy putting tolerances on drawings. "But that action was delayed so long," he said, "that without any practical knowledge of what was right tolerances were put on by theory and as a result several thousand dollars worth of gages were scrapped. They are scrapping them every day now. They are holding up the production of munitions tremendously because of the fact of not having established correct tolerances at the outset.

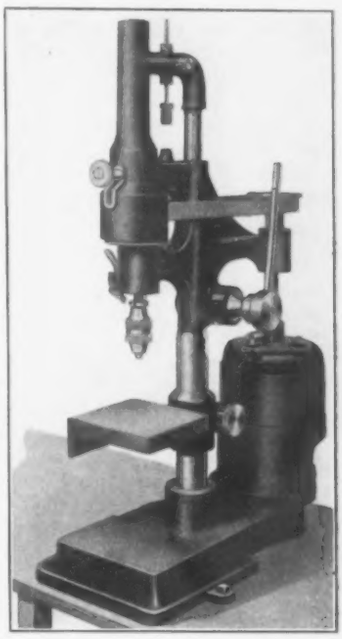
"Army and Naval officers of high rank have agreed with me that if this thing had been done before the war, ten years before, if the French, the English and the Americans, all the Allies, had had one standard of tolerance so that they could have interchanged their blue prints, their jigs and their gages, we would never have had a war. They all agreed with me that Germany would never then have dared to tackle us."

Chairman Ashworth, of the House Committee, is seeking to effect an arrangement with the House leaders to permit the Tilson bill to be taken up for consideration during the coming week. W. L. C.

The Cleveland Cliffs Iron Co., Cleveland, has placed a contract with the Arnold Construction Co., Chicago, for the construction of a new refining house at the North Marquette furnace, Marquette, Mich., to replace one destroyed by fire a few weeks ago. This company has also placed a contract for the erection of a sawing and splitting mill for its furnace and chemical plant at Kipling, Mich.

Sensitive Bench Drilling Machine

A high-speed motor-driven sensitive bench drilling machine has been placed on the market by the High Speed Hammer Co., Inc., Rochester, N. Y. The machine is of compact construction and is readily portable, weighing only 60 lb. A vertical driving motor is used which eliminates the quarter-turn driving belts generally employed, and a spindle lock, which enables the drills to be changed with one hand, it being unnecessary to hold the pulley with the other.



A Vertical Motor with the Pulley Mounted on the End of the Armature Drives a New Sensitive Bench Drilling Machine and Eliminates Quarter-Turn Belts

The machine is equipped with ball bearings throughout, and is designed to handle work ranging up to a maximum diameter of 3/16 in. The spindle, which is driven ordinarily at speeds ranging from 2100 to 6000 r.p.m., is guided through a bronze quill having a support at each end in an annular ball bearing. The spindle is 7/16 in. in diameter, and has a feed of 2¼ in. The end thrust is taken by a ball bearing located under the feed arm.

The table, which is quickly adjustable, has a working surface of 5 x 5½ in. and will take work up to a maximum height of 4⅜ in. The surface of the table is ground to insure accuracy. A self-cleaning taper is provided for the table which is relied upon to keep the main column free from chips, as well as protecting the column against injury. If desired, the table may be swung out of the way and the work mounted directly upon the base, which has a ground working surface measuring 4 x 6 in. In this case it is possible to handle work up to 7½ in. in height. An oil groove extends around the base to convey the lubricant employed and a self-cleaning column support is provided in the base.

At the upper end of the armature of the vertical 1/10-hp. motor is located one of the pulleys over which the driving belt runs. This belt is an endless piece of canvas, and an idler pulley is provided to take up any stretch which may occur. The front driving pulley and the upper part of the spindle are protected by a semi-tubular guard, and the machine is operated by either hand or foot control. A spindle lock is provided, which enables the operator to change drills quickly with one hand without touching either the belt or the driving pulleys.

New Steel Plant at Sydney, N. S.

Construction of a plant for the rolling of steel plates, angles, etc., the output of which will be sufficient to meet the demands of the shipyards of Canada for some years, will be begun at Sydney, N. S., almost immediately, as the result of an arrangement completed between Hon. C. C. Ballantyne, Minister of Marine and Fisheries, and the Dominion Iron & Steel Corporation. The company will build a plant which will be capable of producing 150,000 tons of ship steel annually. It will receive orders for its product from the Canadian Government, and will also be free to fill private commercial orders. The plant will entail an expenditure by the Dominion Iron & Steel Corporation of from $3,000,000 to $5,000,000, and will be ready for operation in from 15 to 18 months. No direct financial aid is being given by the Government toward the construction of the plant.

Drawback Movement Changed by the War

Payments Under Metal Schedule Are Largely on Projectiles and Shells—Tin Cans Almost Entirely Eliminated—Law May Be Amended

WASHINGTON, April 2.—The entrance of the United States into the war just a year ago has stimulated to a marked degree the manufacture in this country of articles for export produced in part with imported materials, as is clearly demonstrated by the official figures showing the drawbacks of duty paid during the fiscal year 1917, which have been compiled by the Bureau of Foreign and Domestic Commerce. A careful analysis of the statistics, however, is necessary to develop their real significance, for, while the exportation of war material with benefit of drawback of the duties paid on the imported materials rose sharply during the year, the substantial increase over 1916, showing great gain over previous years in the total drawbacks paid on all classes of goods, was due solely to a single item not classifiable as war material, though its exportation was stimulated by war conditions. Omitting this single factor from the equation, there had been a steady decline since 1911 in the refunds on exportations until for 1916 a total was reached below that of any fiscal twelve-month in the past 30 years. In 1917, however, the exports of war material started the drawback movement on the upward trend and advance figures for 1918 indicate a still higher rate of gain.

Operation of Underwood-Simmons Act

The falling off in drawback payments is attributable in large part to the practical operation of the drawback law as amended by the Underwood-Simmons act, which became effective Oct. 3, 1913, and which cut off drawback payments upon the exportation of products or by-products which would not be dutiable if imported into the United States in the condition in which they were exported. Because of this modification, a large number of manufacturers were obliged to surrender the regulations under which they had been operating. Although in many cases they were importing dutiable materials, they were denied drawbacks when exporting products or by-products made therefrom, because the Underwood-Simmons act had transferred such products or by-products to the free list.

A very significant relation has always existed between our exports of manufactures of all kinds and the amount of drawbacks paid on such as have been made in part from imported materials. This relation is shown superficially in the following table, which embraces the statistics for the past decade:

Fiscal Year	Exports of Manufactures	Drawbacks Paid
1908	$742,575,841	$6,637,602
1909	671,416,014	6,604,432
1910	768,309,063	6,182,375
1911	907,519,841	6,402,603
1912	1,020,417,687	4,525,570
1913	1,185,104,309	4,543,536
1914	1,099,132,210	3,165,082
1915	1,166,093,728	7,449,236
1916	2,658,917,330	15,273,685
1917	4,134,711,169	17,773,013

The astonishing increase in the total amount of drawbacks paid during the past three years is easily accounted for. The lion's share of the payments in 1915, 1916 and 1917 were made to a single corporation upon the exportation of refined sugar made from imported raw cane sugar, this movement being entirely due to the war in Europe, which forced the practical suspension of the German beet sugar industry. In 1914 the refunds on sugar amounted to $463,047, but in 1915 they rose to $5,209,565, and in 1916 they reached the substantial total of $13,590,757. In 1917 sugar constituted more than 80 per cent of the drawbacks paid, the refunds on that commodity alone aggregating $15,342,272. Deducting the sugar drawbacks from the total payments, it appears that all other drawbacks paid amounted to $2,702,035 in 1914, $2,239,671 in 1915, $1,684,928 in 1916 and $2,430,741 in 1917. The total refunds paid upon the exportation of articles manufactured in whole or in part of imported raw materials dutiable under the metal schedule in 1916 and 1917 are shown in the accompanying table:

Drawbacks Paid Under Metal Schedule

	Fiscal Year 1916	Fiscal Year 1917
Agricultural implements	$97	.....
Aluminum rods, bars and coils	32,180	$2,053
Aluminum plates and sheets	33,884	54,449
Aluminum, all other	76	1,520
Babbitt metal	136	279
Automobiles, commercial	26,055	49,910
Automobiles, passenger	11,497	8,149
Aeroplanes	.....	1,102
Cars, passenger and freight	.....	1,668
Motorcycles	.....	1,288
Electric motors	2,565	4,016
Electric cable and wire	3,027	505
Electric Machinery and appliances	743	413
Explosives, cartridges	11,028	20,307
Explosives, projectiles and shells	111,122	628,381
Explosives, all other	.....	18,172
Ferrovanadium	163	.....
Bars, rods and billets of steel	1,692	175
Steel castings	3,368	60
Cutlery	5,387	2,242
Firearms	.....	25,900
Internal combustion engines	2,311	1,167
Traction engines	2,084	1,099
Steam locomotives	1,173	3,099
All other engines	1,491	.....
Parts of engines	1,083	132
Sugar mill machinery	577	154
Sewing machines	696	.....
Textile machinery	.....	2,623
All other machinery	631	333
Tools	16,459	10,185
Steel wire	89	.....
Wire rope	3,036	1,050
Other manufactures of iron and steel	1,471	.....
Lead, shrapnel bullets	.....	2,831
Lead pipe and fittings	108	687
Lead wire	10,359	.....
Metal containers except tin	13,273	16,054
Tin cans	22,546	5,673
Zinc, smelter in pigs, etc	31,018	19,355
Total	$389,103	$885,031

Effect of War

Only a glance at this table is required to show that the drawback movement today is based almost wholly on the war. In fact the 125 per cent increase recorded in 1917 over 1916 is considerably less than the gain in the single item of projectiles and shells, which rose from $111,122 to $628,381. The imported materials used in the manufacture of these projectiles and shells included the following: Antimony metal, $178,005; antimony, oxide of, $199; bronze powder, $13,084; cartridge shells, empty, $101,532; steel bars $3,931; lead-ore, $2,395; lead balls, $31,208; type metal, $2,192; metal manufacturers, including iron and steel, $273,452; mineral substances, $22,219; coal tar products, $160. The item of cartridges rose nearly 100 per cent, the total in 1917 being $20,307, that amount being paid on the following imported raw materials: aluminum wire, $3,924; antimony metal, $811; lead ore, $510; lead pigs, $15,063. The manufacture in the United States of large quantities of firearms for foreign Governments brought this item into the drawback list for the first time in 1917 with a total of $25,900. Duties to this amount were refunded on various materials used in the manufacture of machine guns, the largest item being steel ballbearings, $25,676.

Tin Cans Eliminated

War conditions have nearly eliminated from the drawback list an item which a few years ago dominated the entire schedule, namely, tin cans. Extraordinary fluctuations have marked refunds on these articles from time to time since the passage of the McKinley tariff act in 1890. The American industry engaged in the manufacture of tin plate was put fairly on its feet by

the McKinley law, and soon began reaching out for the business that formerly had gone to the Welsh plate producers. The domestic manufacturers undertook to induce exporters of canned goods, especially petroleum, to use American plate on the basis of a price representing the foreign cost of plate less the official drawback. Exporters availed themselves of this arrangement and have since utilized it extensively, and it has been but occasionally that market conditions have been such that any considerable quantity of foreign plate could be profitably used in competition with the domestic product carrying the unofficial rebate. In 1915, for example, there were heavy importations, the refunds amounting to $476,014. In the following year, however, the drawback dropped to $22,546, and in 1917 it fell to $5,673. Users of tin plate for containers now find themselves in a decided quandary in view of the plans of the Government to prohibit the exportation of tin cans except as containers for food and the practical embargo which Great Britain has placed upon exports of tin and tin plate except under close supervision designed to conserve these products for war purposes exclusively.

The United States Tariff Commission has been asked to investigate the question of the desirability of amending the drawback provision of the present law either as a special enactment or in connection with any prospective tariff or revenue legislation. Important interests that have utilized the drawback statute to substantial advantage in past years desire to repeal the proviso to the original drawback section, which was added by Congress in 1913 in the following terms:

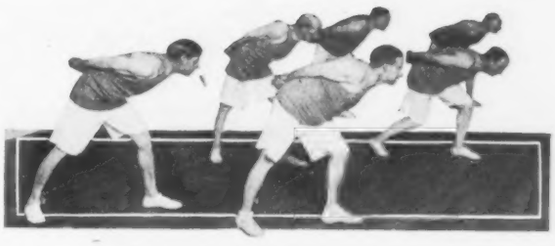
Provided, That where a principal product and a by-product result from the manipulation of imported material and only the by-product is exported, the proportion of the drawback distributed to such by-product shall not exceed the duty assessable under this act on a similar by-product of foreign origin if imported into the United States. Where no duty is assessable upon the importation of a corresponding by-product, no drawback shall be payable on such by-product produced from the imported material; if, however, the principal product is exported, then on the exportation thereof there shall be refunded as drawback the whole of the duty paid on the imported material used in the production of both the principal and the by-product, less 1 per cent as hereinbefore provided.

Drawbacks Cut Off

The practical effect of this change in the law has been to cut off a large class of drawbacks paid on the exportation of by-products, the chief product remaining in the United States, and in certain industries large plants have been forced to close down. Under the Aldrich-Payne tariff act of 1909, a shipbuilder or other manufacturer working on a foreign contract and using imported steel plates, for example, could ship his scrap to some convenient foreign port and secure a substantial proportionate drawback of the duty paid on the plates. Under the tariff act of 1913, however, scrap iron and steel went to the free list, and, therefore, although imported steel plates pay a duty, the domestic manufacturer using them in the production of some article for export is denied a proportionate refund of duty on the exportation of the scrap. The ultimate effect in this and many other cases has been to increase the cost to the American manufacturer of his foreign material, which, obviously, was not the chief purpose of the Underwood-Simmons act, which effected substantial reductions in the leading tariff schedules. W. L. C.

The Biggs-Watterson Co., Cleveland, dealer in machine tools, traveling cranes, railroad supplies and hydraulic machinery, is moving its Cincinnati office to Dayton, Ohio, where it will have a store and office combined. This store will be located at 38 South Jefferson Street, where the company intends to carry a stock of tools and supplies. The Dayton branch will be in charge of W. P. Dolle.

The National Automatic Tool Co., Richmond, Ind., has raised the wages of all employees except the office force, 10 per cent.



PAY EMPLOYEES TO EXERCISE

Executives of White Co. Spend an Hour Daily in Office Building Gymnasium

Vigorous physical exercise daily, under the direction of a trained instructor, for the conservation of the health of its employees, is the preparedness plan recently inaugurated in one of Cleveland's largest industrial plants, that of the White Co. This training is expected to build up the physical endurance of the men to a point which later on will enable each man to assume added responsibility, if necessary. The plan applies to the executive officers, superintendents, managers, heads of departments and others on whom rests the responsibility for the solution of important manufacturing and selling problems.

Under the provisions of the new plan, which has been in effect since Nov. 1, the men holding responsible positions are urged to spend an hour each morning or afternoon in a spacious new gymnasium in the basement of the administration building. The men are in effect paid by the company for the time they thus spend, and no business appointment or other important task is permitted to interfere with this schedule. The men are compelled under the penalty of a heavy fine to report at a specified time and are not permitted to leave until the class is dismissed.

The results of the training, so far, have been gratifying to both the company and the men. The plan may, later, be extended to include all of the 5000 or more bookkeepers, clerks, accountants, salesmen, stenographers, skilled and unskilled workmen in the plant.

Gymnasium Record

	Age 36	Age 46	Age 37	Age 42	Age 35	Age 47
Weight, lb., before.	216	163	155	142	136	122
Weight, lb., after..	—7½	—6	+3	—5	+2	+5½
Neck, in.	*	*	+½	+½	+½	+½
Chest, nor., in. ...	*	+1	+2½	+2	+½	+1
Chest, con., in. ...	*	*	*	*	*	+½
Chest exp., in	+2	*	+2	+1	+2	+½
Right arm, in. ...	+1	+½	+½	*	*	+½
Left arm, in.	+½	+½	+½	*	*	*
Waist, in.	—1½	—1	—1	—½	—1	—2
Right leg, in.....	+2	+½	+1	+½	+1	+1
Left leg, in.	+2	+½	+1	+½	+1	+1

*No change.

The physical instruction work is being conducted by W. E. Rice as athletic coach, a graduate of the Chicago Training School. The course of instruction consists of passing the medicine ball, setting-up exercises, stall bar work, handball, wrestling, club swinging, bag punching and other forms of calisthenics. A battery of shower baths is, of course, provided. Before entering the class the man undergoes an examination by the company's medical examiner. The doctor's report is filed in the superintendent's office. The examination is repeated regularly every month. If a man is found to be nervous, underweight and suffering with some minor trouble, he is given medical attention and advised by the physician and physical director as to the proper course to pursue to improve his condition. In many cases a change of diet has helped materially to remedy ailments.

The following table compiled from a few members of Class No. 1 shows the following relative gains and losses; the ages of these men range from 32 to 48 years, and all have been in the employment of the White Co. from 10 to 30 years.

How to Reduce the Turnover of Labor

Methods Successfully Applied at an Ohio Steel Works—Get the Right Man for the Job and Advance the Fit Men

BY ERNEST C. GOULD*

ONE of the most perplexing problems before the manufacturer to-day is to get enough men to operate his plant and to keep these men after he gets them. The scarcity of labor has put a new light on the problem of labor turnover, and now it is realized to some extent how greatly this problem affects production costs. Employers have long since turned from mere discussion of this subject, and already have put time and money at work to arrive at a solution.

But as in all new undertakings, this campaign for reducing labor turnover has encountered many bewitching theories, isms, systems, and other such propaganda which have served only to mislead and to handicap seekers after truth. It is high time that conservative industrial managers get back to facts and apply common ordinary logic and the same effective system of analysis to the labor problem that has won success for them in the fields of finance, sales and manufacturing.

Fundamental Propositions

The first principle to use in the solution of the labor problem is to know the vital facts about the men of an organization—to quit making guesses and get to the real facts. The successful employment plan involves three propositions:

1. Get the right man for the job.
2. See that every employee gets a square deal.
3. Make it possible for every man to better himself in the organization.

The first proposition seems to be the stumbling block for most employment men. It is certainly no cinch to get enough men to keep a 10,000 man-power plant in operation, let alone trying to place each man on the job he is best fitted for, especially when there are a thousand or more different jobs in the plant. But employment managers can greatly improve upon their efforts if they will only apply some of the same methods used by the accounting and efficiency departments. The following outline indicates in a partial way how these principles can be applied.

Census First

1. A census should be taken of every employee in the plant on a definite date. Such a census should show:

A. Total number of employees by departments and jobs and by

1. Nationality.
2. Age.
3. Marital condition.
4. Housing condition.
5. Location of family.
6. Citizenship.
7. Language spoken.

B. Trades, education and previous experience.

C. Length of service with the company.

The advantage of such a census is that it will furnish the employment manager definite information as to the type of men he has employed on various jobs and in various departments. It gives him a basis for making future studies as to the adaptability of new men for certain jobs and departments.

2. An analysis should be made of each job and kept in shape for ready reference. In a large plant, the employment clerks do not and cannot know the individual requirements of every job. However, with the aid of the information given on the form shown here the clerk will be able to better place the men before him on the jobs for which they seem to be best qualified. This sort of hiring requires some thought and study and the employment clerk should give each man a private interview and study him long enough to make an intelligent placement of that man. Many employment departments judge their success by the speed at which they can rush men through the gate. Plants with speedy employment offices are always in need of men.

Outline of Job Analysis

1. Job identification or name.
2. Brief description of the job, showing how it is related to the jobs preceding and following the sequence work.
3. Maximum number of employees needed to take care of present equipment.
4. Hours of work and shifts.
5. Wages to start and wage limit. Also how paid, as by day rate, piece rate or tonnage, bonus, etc.
6. Time required to learn operation.
7. Type of work.
   - (a) Posture—whether the work requires one to sit, stand, stoop, walk, run or climb.
   - (b) Motion—quick, slow, steady, continuous or occasional.
   - (c) Small dimension hand work, large dimension machine work.
   - (d) Heavy lifting or light, shoveling, etc.

The Human Element

1. Physical requirements:
   - (a) Size of man—tall, short, heavy.
   - (b) Muscles—strong in arms, back, in legs, etc.
   - (c) Eyesight and hearing.
   - (d) Normal, cripple, etc.
   - (e) Age and sex.
2. Nationality preferred.
3. Mental characteristics.
   - (a) Education, trade or experience necessary.
   - (b) Type of mind:
     1. Mental type.
     2. Manual type.
     3. Settled type.
     4. Roving type.
     5. Indoor man.
     6. Outdoor man.
     7. Directive.
     8. Dependent personality.
     9. Large dimension worker.
     10. Small dimension worker.
     11. Adaptable personality.
     12. Self-centered personality.
     13. Deliberate.
     14. Impulsive.
     15. Dynamic.
     16. Static.

3. There should be a daily statement of labor. The accompanying form No. 1 shows a carefully worked-out daily statement of employment and turnover figures. It takes up each department and shows the number on the rolls, the number hired each day and for the month and the year to date, and also the number leaving with the number left at end of each day. Such a report will keep the

*Industrial Relations Department, Youngstown Sheet & Tube Co., Youngstown, Ohio.

management in daily touch with the labor situation in each department.

4. An analytical monthly study should be prepared, showing the reasons why employees left and the type of employee leaving, by jobs and by departments. Comparison of this information with that of the census and the job analysis will help the employment manager to know where the weak spots are and also will give him a pretty good diagnosis of the case. With such information at hand he can then administer the proper remedy.

The accompanying form No. 2 shows the make-up of an analytical labor report. The sheet summarizes the departments and treats them as a whole. The reasons for leaving are in code, and any eighteen reasons can be used. But each reason should be definite and specific and not general.

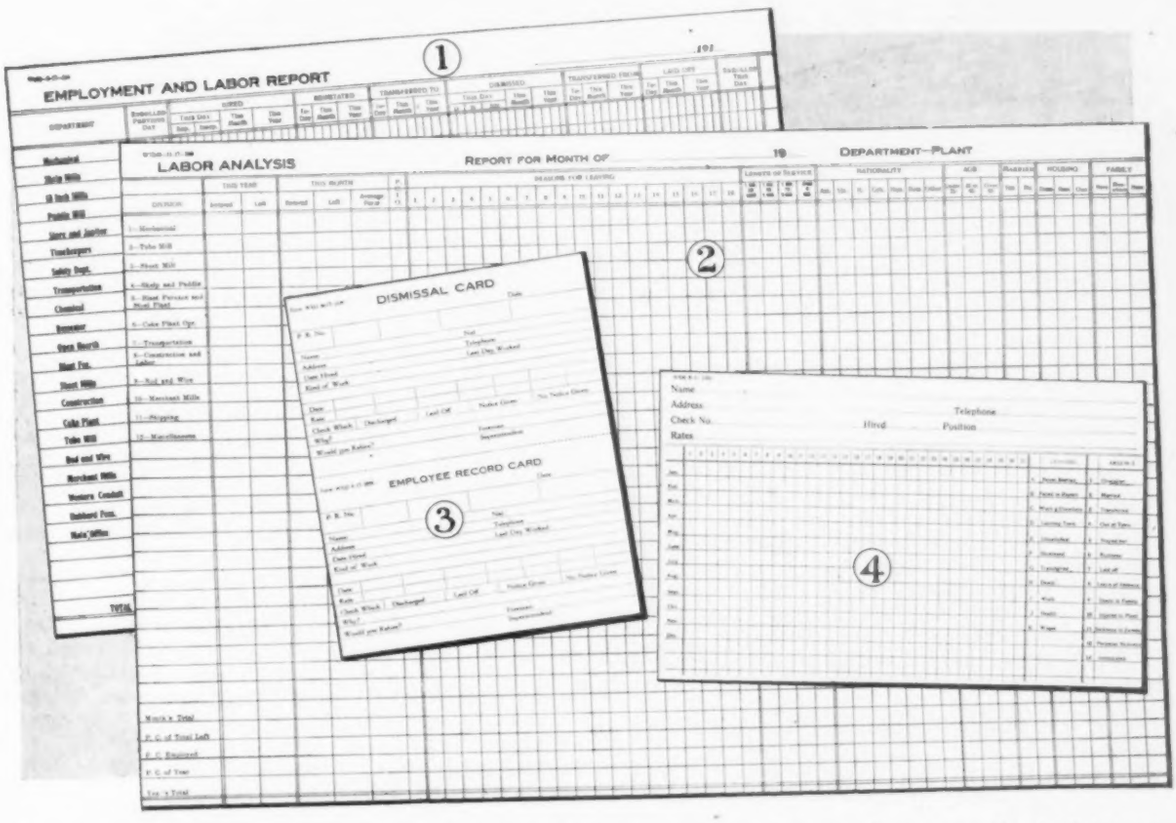
The Square Deal

The second main proposition, as we have stated it, is to see that every employee gets a square deal. This is also a tough proposition, especially in plants that employ thousands of men. In every organization there should be some third party to whom man and foreman can make an appeal if either feels that the other is not treating him right. Most men aim to be honest and fair with their fellow men. But there are times when misunderstandings will arise which will so cloud the vision of the parties interested that they cannot see the other side. It is for such cases that an arbitrator or a court of appeals within the organization should be available. Such a plan will reduce both discharges and voluntary quitting.

To aid in such work a record should be kept of each man and kept up to date. In this way every man makes his own record as he goes along. When he gets into trouble his case will not be settled solely upon one particular instance, but his whole record with the company will be taken into consideration. These records, forms Nos. 3 and 4, are also useful in considering transfers, promotions and lay-offs. After the man has left the company, form No. 3 is completed and one half is sent to the employment office, where it is referred to if the man should later seek to be re-employed.

Advancement for Fit Men

The last but not the least of the three canons of successful employment practice is not new. It involves the question of education and follow-up of employees. Every plant should provide practical courses of instruction which will fit its men for better things in its organization. But equally important, the employment department and the factory superintendents should have a follow-up system of keeping track of the men who are deserving of advancement. Every skilled job should be filled by an employee from within. In the average plant hundreds of good jobs are filled by outsiders every week, when employees within the plant could be found to fill these places had the authorities knowledge of who these men are. No plant is efficiently organized where understudies are not trained for jobs ahead.



Forms Used by Employment Department: No. 1—Daily Employment and Turnover Statement. No. 2—Tabulated Reasons for Quitting. Nos. 3 and 4—Individual Record Cards

Every proposition that has been put forth here is one that involves a knowledge of local facts and conditions. Not one is a patent ready-made remedy which is a cure-all. Those who are looking for a panacea to solve their labor problems are doomed to disappointment. The only solution is to study and know local conditions and then make a direct application of the Golden Rule.

The Walcott Lathe Co., Jackson, Mich., has let the contract for a large addition to its plant, the increased capacity planned being about 50 per cent. North & Bradshaw are the contractors, and the work is to be completed in 90 days.

Facts Assembled on War Labor Problems

Industrial and Efficiency Engineers at Chicago Conference Hear Report on 1000 Questionnaires on Employment of Women in Industry

"LABOR Problems Under War Conditions" was the general topic of the national conference held under the joint auspices of the Society of Industrial Engineers and the Western Efficiency Society, March 27 to 29, at the Hotel La Salle, Chicago, and on all three days the subject was pursued most intensively at morning, afternoon and evening sessions. The attendance was good. The meetings at which stated papers were presented alternated with round-table conferences at which there was general discussion.

Briefly, the consensus of opinion seemed to be that while the widespread employment of women in industry is not yet necessary, it is bound to come if the war continues for any considerable length of time; and the nation and industry should prepare for it. That men workers are not properly distributed was conceded. That women should not be exploited was maintained. That there is a multitude of trades in which women can be usefully employed was agreed.

Ample attention was given to the need of obtaining the maximum production of the men who do not go to war, and much was deduced as to methods of adapting the maimed or crippled men who return from the war to useful industry. Some progress in the United States in this direction was reported, but more was said, as naturally could be, as to what had been done abroad and in Canada.

Questionnaire on Women in Industry

The most important feature of the meeting was easily the conclusions of 1000 answers to a questionnaire on women in industry, embodied in a first report submitted by C. E. Knoeppel of New York. The report was an exhaustive treatise dealing with the question from many angles, and composing a volume in itself. It was presented at the evening session of March 27. Only a brief outline of the report, and a few excerpts from it can be given here. Mr. Knoeppel treated the great mass of views and facts elicited by the questionnaire, from manufacturers and individuals, including labor leaders and economists, etc., under the following sub-heads:

Are women going to be needed in industry?
Are women needed in industry now?
The experience of Great Britain.
Our experience to date.
Report covering analysis of questionnaire.
Appendices A, B, C, D, E. The five sub-divisions required 99 typewritten pages.

Mr. Knoeppel first discussed the present military situation as having a vital bearing on the extent to which industry will call on women. He quoted freely from the military experts of the world, and reached, among other conclusions, this: "From the viewpoint of the present military situation, the superior political strategy of the Germans, and the lack of shipping, a long and bitter war is ahead of us, requiring millions of men in the field."

He reached the conclusion that at the present time women are not needed in industry (on war work) for the reason: "Simply because we are not using our man power to the extent possible, nor as efficiently as we can." In support of this contention, Mr. Knoeppel read a letter he had received, in part as follows:

"At lunch to-day, a man checked my hat, another man served my food, another man removed the dishes—and still another brought my cigar. Yet we pretend we are organized for war.

"After lunch a man shaved me and another man shined my shoes, while I read a paper sold me by a man who might have been—should have been—at war. A man carried my bag to the sidewalk, another man opened the door of a man-driven taxi to take me to my train. A man opened the taxi and another man grabbed my bag; a man sold me my ticket and another man examined it. On the train TWO men took up the ticket and a polite young man who might be, should be, fighting, is typing this outburst to you. R. C. Wadsworth."

Mr. Knoeppel concluded: "We should first use women in the lighter occupations in order to utilize our man power properly, and avoid exploiting women, or putting them at industrial work, before industry is ready for them, and my analysis indicates that industry is not ready for them as yet. By ready, I mean providing safeguards, proper training, careful selection and the like; also, we need a policy, a plan of action, with the Government behind it, and organized labor and the manufacturers of the country co-operating to the fullest."

The experience of Great Britain was dwelt on in detail by Mr. Knoeppel. He quoted from the findings of Miss Frances A. Kellor, of the National Americanization Committee of New York, concerning the enlistment of labor union support, the abandonment of trade customs, etc. He brought out the fact that it requires 6½ home workers to maintain each man in the field.

Replies to the questionnaire clearly indicated that manufacturers were not acting in a concerted manner nor along well-planned lines in respect to labor.

No Time for Settling Labor Disputes

The Colburn Machine Tool Co. had abandoned the idea of employing women because of objections that came from the machinists' union. Frank Morrison, secretary of the American Federation of Labor, denied that any scarcity of labor existed, as did other labor leaders. Commenting on a statement by Samuel Gompers, which in part said: "The time for labor to interpose its needs and contentions is while policies are in the making," Mr. Knoeppel stated: "To this we only partially subscribe. I agree fully with President Wilson and Secretary Baker that we must protect and safeguard our workers, especially our women and children. I go on record by saying that we do not need women in industry now, if present man power can be made more efficient and we can recruit men from the lighter occupations. I go on record also by saying that in all discussions of plans and policies governing labor during war times labor should be represented.

"But this is no time for a debate of labor rights or the rights of capital, nor is it a time for a discussion of your rights or my rights. The question squarely before the country, which we—100,000,000 of us—must answer now is: Will we be a free people or a vassal people?"

Mr. Knoeppel quoted from a statement by an investigator in Zanesville, Ohio, saying that women were there engaged at hard labor, such as loading scrap iron, sorting scrap iron, wheeling iron castings, etc., alluding to this and similar instances as abuses of the opportunity to utilize woman labor.

Two principles which should be given consideration in the matter of using women were mentioned by Mr. Knoeppel, as follows: "Most of the women who will go into industry are the future mothers of the race and the wives of our sons and must not be exploited. There must be no charity about what is done, nor must the attitude toward them be one of patronizing." The answers to the questionnaire, Mr. Knoeppel said, were a revelation "in that the general trend was altruistic, big-minded, clean and thoroughly American, and showed conclusively that organized labor has nothing to fear from the manufacturing world on this question of women in industry. A disappointment, in that there

was evidence of lack of plan, no co-ordinated action and lack of co-operation, so necessary in the successful use of women in our factories."

Many Phases to the Problem

The results of the investigation were arranged in the following classifications: Work to be performed by women, finding the women, selection of women, training women, wages, hours and fatigue; working conditions, living and social conditions, state laws, co-operation of labor unions, women's organizations and Government and post-bellum consideration.

A conclusion reached follows:

Experienced men for difficult and complicated work.
Laborers for heavy manual work.
Women for light, simple or semi-complicated operations with men setting up the work.

It was argued that an analysis of work, based on the consideration of the above fundamentals, would very quickly in each department, plant and industry, determine what women could and could not do, after which a list of permissible operations could then be worked up, by the Government or under Government direction, and industry generally advised as to the field for women, as was done in England. Mr. Knoeppel continued: "The consensus of opinion was that if wages for women are to be the same as paid men for the same work; if conditions are made both attractive and such that women can work without injury to their health; there would be no question about getting them to respond."

A suggestion under the heading of "selection," was that, "In many cases women could take up the same work as their fathers, brothers and husbands, because of the ability of the men to assist and instruct the women in mastering the various phases of the work they are familiar with."

After making various suggestions as to training women for new tasks, Mr. Knoeppel took up the matters of wages, hours and fatigue, and said that with regard to wages, the following was a conclusion:

1—Determine standards, and pay according to performance.
2—Piece work with minimum wages guaranteed.
3—Weekly wage for a time, then piece work.

He said that the principle "equal pay with men for equal work" was subscribed to by practically all who answered the questions. In answering the questions as to hours, rest and fatigue, the conclusions were: No night work, no overtime, no Sunday work, half Saturdays off, an 8-hr. day, some urging a 54-hr. week; a rest period in the morning and in the afternoon, in addition to the lunch period, and varying from 10 to 20 minutes, experiments to determine rest periods and fatigue factors in work of a very fatiguing nature.

Other conclusions derived from the questionnaire were that places where women work should be well lighted and well ventilated, and wherever possible, stools or chairs provided, and that women should be started on the lighter tasks. He also said:

Working and Social Conditions

"Women should be segregated if this can be done, either by new buildings or rearrangement of departments or machines. At first men would have to be used as foremen, but later forewomen could be used. There should also be provision for emergency illness with a nurse in charge if no hospital is attached to the plant. Working clothing of women should be standardized. Overalls can be used or waists and aprons. Caps should be worn for protection of the hair. Whatever is used should be uniform, neat and clean. If all are dressed alike there will be less rivalry as to dress and less in the way of comments by the women regarding the matter of dressing. A matron should be employed."

Mr. Knoeppel also went into living and social conditions, etc., then took up the matter of state laws, saying:

"From the answers received, plus an analysis of the state laws, there seems to be a need for some national legislation of an emergency character, so that standards can be set and then maintained, and while it may be said, and truly perhaps, that the present is no time for new legislation as important as this, it was felt that much could be done by bettering the present laws."

Under the heading of Labor Unions, Mr. Knoeppel said, in part:

"Efforts should be made to analyze and anticipate the fears of labor, for in this as in everything else, differences are the result of misunderstanding, and there should be no misunderstandings in this crisis. It should be made plain that no displacement of men will be made when men are available; that men returning after the war will be given work to do—and this must be a Government promise which should be carried out. Equal pay for the same work, same hours, right of women to organize, suffrage, and maintenance of proper working, living and social conditions. If labor objected after the above are provided, then it hasn't a leg to stand upon, and the Government should step in, establish profits, arrange for compulsory arbitration, waive restrictions on output and use of women labor, prevent cutting of rates and insure proper working conditions."

After the war is over, in the general opinion, home will make the real appeal to women and many will drop out of industry for this reason. While a great many will remain at work, many others will drop out because of not finding industrial work to their liking.

Harrington Emerson on Bolsheviki Spirit

The convention was opened by F. A. Carlisle, president Western Efficiency Society, and the meeting was addressed by Harrington Emerson, president Emerson Co., who held his audience with an epigrammatic and philosophical dissertation on the disinclination of most human beings to work. Among other things, he said:

There are two diametrically opposite ways of increasing wages. One is to make the increase depend on bettered performance.

This is adherence to the old law of nature, under which the most diligent cow got the most grass, the most diligent wolf got the most prey.

Such an increase in wages is self-regulating. The ambitious man earns more because he delivers more.

He earns more from line leadership and he earns more from staff counsel.

There is greater output at lower unit cost, the world is growing richer, there is more for the worker. Each hour of work brings him bigger reward.

The other way to increase wages is to raise them without reference to performance. The immediate result is that the worker takes his bonus in lessened effort. He no longer works diligently 10 hours, he works loafingly six hours.

For each hour of work there is less return, the world drifts backward, civilization is slumping. That is what happened in Russia to the limit. Production has stopped. Nobody works except the peasants in their fields.

Five years ago it would have been inconceivable that any great country could so absolutely collapse, not only in a military way but industrially.

In this country we are following Russia's lead. We shall not go so far—we are only half way Bolsheviki. Wages have risen and output has declined. Men expect 50 per cent more wages for three-quarters as long a day and about 60 per cent output an hour.

In Russia things are kept going by issues of paper money. In this country they are kept going by huge bond issues, by using up with incredible rapidity the accumulations of the past.

The younger men are more unreasonable than the older.

The great outstanding fact is that the United States will probably produce less this year than last year.

Mr. Emerson said the Bolsheviki spirit is rampant in this country, and that he expected a great readjustment after the war, and one that would be backward rather than forward.

Standardization of Shop Practice

On Thursday A. Russell Bond, managing editor of the *Scientific American*, was a speaker, talking on "Mechanical Aids to Man"; also W. S. Ford, efficiency manager Montgomery, Ward & Co., after which an address, illustrated by lantern slides, was given by Ellis F. Muther, general sales manager Gisholt Machine Co., Madison, Wis. His topic was "Standardization in Ma-

chine Shop Practice and the Training of Operators." He used many slides.

Mr. Muther explained that experience had demonstrated that several branches of his company's work could best be handled by individual engineers, and that the designing and engineering departments had therefore been divided into six divisions. One division looks after the design of turret lathes, tool grinders and horizontal mills, this being possible because the demand for horizontal mills is limited and the work on the grinder has been standardized to a great extent.

Another division cares for the vertical boring mills and simplified lathes, this being made possible because of the fluctuating market for the two machines. Then the demand for vertical boring mills fell off; there came a demand for simplified lathes.

Another department looks after the automatic turret lathe.

A separate engineering organization is maintained for the design of tools, jigs and fixtures for use in the Gisholt shops.

The fifth division devotes its entire time to figuring out the problems of customers, and in designing tools, jigs and fixtures for use in customers' shops, this division being a branch of the sales department.

The sixth division devotes its time to the engineering problems of the periodigraph, a workmen's time recorder, which not only records the time and departure of the man, but also the time he gives to each piece of work he handles.

Great Importance of the Machine Tool

Emphasizing the importance of the machine tool, Mr. Muther said:

"The labor problem has always been a big one, and will doubtless continue to be an exceedingly important one, but we are faced with a peculiar situation now, one never known before, due to the great numbers of men, not only in our own country, but throughout Europe, who have been taken from their regular pursuits and put in the army.

"The spectacular part of this great war is being acted on the battlefields, yet we all know it is a mechanical war, and the foundation of it all is the machine tool.

"You cannot build a battleship, a motor truck, a flying machine, a tank, an electric motor, a searchlight, a gun, a shell, or any other of the implements of war without the machine tool on which to work. Let us go further. You cannot plant grain, nor reap the harvest with which to feed our armies and the people behind the armies without machine tools with which to build the implements. You cannot mine coal, mineral oil or any of the other deposits of nature which are so essential in this war without machine tools with which to build the apparatus used in the operations. Therefore I think you will agree with me that the machine tool is the foundation on which our success in the war depends, and is one of the fundamental elements which are absolutely necessary with which to prosecute the war to a victorious end.

"The work of building battleships is the same as the building of merchant ships, the tank is nothing but the large tractor, the armored car is nothing but our pleasure car, or our motor truck re-arranged, etc. Therefore you see the machine tool is just as important in time of peace as in times of war. Manufacturing, whether it be the little country job shop, or the greater industries such as the General Electric and Westinghouse Electric, are dependent on labor. Just so long as the human element enters so vitally in these problems, just so long will we have to face the problem of standardizing machines and of training people to handle these machines.

Training of Operators Big Factor

"One of the most important subjects before the manufacturing world to-day is the training of operators. In our own shop, or rather in the school which we conduct for such training, the principles involved and the methods followed, which we think are original with us, are entirely in keeping with the methods which the Government is following in the officers training camps, as well as at the cantonments throughout this country. Several years ago the true understanding of just what we were selling came to us, and we realized that we had to furnish more than the machine, because the buyers really do not care for the machine itself—that is not what they buy—they really purchase production, or at least productive capacity. Production from any machine is, and always will be, dependent upon the human equation; you must have operators who know the machine. They must know what work the machine will handle, and how to get the work out at the lowest possible cost. This can be accomplished only by having men as operators who know the machine, what it will do, and how to do it.

"For many years we have tried to give this production to our customers, by sending out experts into the customer's plant when new machines were installed. This helped to a limited extent, as the management was able to begin production much quicker than when it was sought to start the machine alone. But, unfortunately, not many firms had men in their employ who could get the maximum production and keep it up. During the visit of our expert he instructed the operator how to handle the work and how to operate the machine as far as the time and conditions under which his visit was made would permit.

"The foreman and superintendent usually were able to understand the principles of Gisholt manufacturing methods better than was the workman on the machine, but many things demand attention in every shop, and soon the manufacturer found his production largely dependent upon the man operating the machine, under which conditions, production would usually fall off, due to the limited training of the workman.

"All this was changed and now each customer may have an expert in his own shop and in his own employ. We are now in a position to meet the demand, in that we train men to get the maximum production from our machines. For a time we tried to train our own men for the customer, but it soon developed to be best for the customer to have one of his own men trained for the work, instead of getting an outsider."

Men Coached in All Details

Mr. Muther at this point showed a picture of a group of young men attending the Gisholt school, explaining that the advantage to a manufacturer in having one of his own men trained lay in the fact that the man was familiar with his home shop conditions and the work being done, also because men from other places are likely to desert to return to their old homes. He said also:

"In the school we have equipped, which is entirely separate from our factory, we train men in the care, operation, tooling, etc., of Gisholt machines. They are trained in the details of construction of the machines, and know how to adjust and care for the machine in a way that obviates delays and loss of production. He will be taught how to grind his cutting tools, and this is most important. When he returns to your shop he will know how to make free-hand sketches, how to plan his work in advance, and how to instruct other men in the use of the machines. The training course covers practically everything a man may be called on to do, such as thread cutting, taper turning, drilling, boring, reaming, etc. He is taught the value of doing things promptly, neatly and accurately and how to do them.

"No charge is made for the training, we provide everything required, special instructions, equipment, tools, books, etc. There are some requirements an applicant must meet before he is accepted. We require that he has a foundation of shop training."

Mr. Muther explained that when a student reaches Madison he is taken to a rooming house. Then he is taken for a walk of inspection through the plant. He is shown the tools he will use during the course, which usually requires from four to eight weeks. "There are some 25 tasks which each man has to perform," said Mr. Muther. "As a time is set for each task, and a record is kept on the Periodigraph, each man is taught the essence of economic production.

After being instructed in the method of recording his time, his first task is to dismantle the grinder. With him at all times is the instructor, but the student handles the machine and does the work. After the student has assembled the grinder he is taught to grind his tools to get the proper rake and clearance. He then goes to the turret lathe, and dismantles a 21-in. machine. He is taught how to scrap in the bearings on an old machine, and the principle of scraping the V's with a surface plate. Then he must assemble, adjust and oil the lathe, after which he must operate it so that he becomes familiar with the functions of each part.

"The student next goes to the 28-in lathe, where he is taught the method of taking heavy cuts. He must clean the lathe, after which he will set up to manufacture a countershaft friction pulley and his work must pass the inspector, after which he will be allowed to make a dozen of the pulleys.

Taught to Lay Out and Estimate

"He next goes to a new motor-driven 21-in lathe, where he is taught to bore out the jaws. He also is instructed in thread cutting, taper turning and how to set up for drilling, boring, reaming and turning. He must dismantle the set-up, clean the tools, and then set up the machine for bar work and manufacture a few cross-head pins, after which he must dismantle and clean his machine and put the tools away. At all times it is sought to instill in each man the spirit of being clean and orderly. The student finally goes to the school office, where he is taught how to estimate and lay out his work in advance, so that he can plan his work before it comes to the machine. Having completed the course, the student starts in as an instructor himself, and takes a new man through the entire course during which the new man will be the doer and the man who has been through once will be the teacher. This prepares him for handling other men when he gets back to his home shop.

"The first benefit of what I have outlined comes to the man himself, and this is most important as it enables him to better handle his work, and thereby improve his place in life. The next benefit comes to the manufacturer who purchased our machines as he gets better returns from the money invested. But the most important benefit, we believe, comes to our nation as a whole, as through this method of training men we can produce two or three times as much work with the same number of men as was possible before."

It is understood that the Gisholt method of training operators has been brought to the attention of the United States Government.

How Labor Is Employed in War

On the evening of the second day of the conference an address was given by Irving A. Berndt, manager of the betterment department, Joseph T. Ryerson & Son, Chicago, his subject being "Men Remaining—Securing their Maximum Production." In part he said:

"Government authorities advise us that it takes four to six men in industry to keep one in the service. Considering an average of five for this work we find 10,000,000 men work on war production. This represents our second group. Deducting this total of 12,000,000 from the approximately 30,000,000 workers normally engaged, we have remaining in our third group but 18,000,000.

"The men in the first class are already doing their best. We cannot hope to influence their effectiveness, but we can and must stand back of them a solid mass, and we can and must organize our productive groups in the second and third classes so that they will always keep pace with the requirements of our fighting men and assure them at all times that our efforts are to be co-ordinated and united. We must also actively and vigorously prepare for further drains on our ranks of industrial workers for this fighting service by developing an ever-increasing efficiency of those at work, so that as demands are made on the industry she will be ready and willing to unselfishly continue to give up her best and youngest men and still keep pace with requirements at home.

"The second group must be educated and inspired to a complete appreciation of the possibility of the valuable service they can and are rendering in winning this war, and must be coached and trained to a higher efficiency and greater productivity in the actual production of war supplies.

"The third group, that army of 18,00,000 men left to carry the burden formerly carried by 30,000,000, for although some of our industrial activities have temporarily ceased, demands have increased in other directions, and particularly because we now must help in supplying our allies with necessities, that third group must first be reconciled to their position; second, must be brought to an appreciation of the serious necessity of an ever-increasing productivity, and, finally, must be assisted and trained for this greater efficiency.

"And in all this great and necessary work, in the solution of this problem of human relationships, who is there can be more useful, more effective or more definitely influential than the industrial engineer?"

Suggests Labor Conservation Director

In conclusion, Mr. Berndt said:

"To this end I believe there must be greater activity in every direction and suggest the following possibilities:

"1. All trade organizations already existing should concentrate on a study of the principles of efficiency, using the considerable literature already available and securing the best intelligence included among their own ranks on this subject. Where in a given trade no such organizations exist this purpose alone would be a real reason for their organization. The more successful and most intelligent industrial leaders in each group must come to the front and help to educate their associates, realizing that the present is a time for utmost co-operation.

"2. I believe that every influence should be brought to bear which will tend to continue the existence of all the great educational institutions which are now dealing with this subject, so that they will not only continue to do all they have been doing in education a future generation of managers but also to do a more intensive and also extensive work in educating the workers and the present executive through night courses, reading courses, etc. Such institutions as are capable but have not yet taken up this work should be influenced toward doing it.

"3. Organization of all kinds, including efficiency societies, executive clubs, chambers of commerce, labor organizations and the like should concentrate on this problem and not only reach out in their own localities to educate the uninitiated worker or manager, but should urge new organizations like their own in other communities and co-operate with them after they have been organized. Here again the leaders must take upon their shoulders the larger responsibility and give freely to their neighbors of their time and knowledge on this subject.

"4. All of the above should not only be advocated but rigidly enforced and thoroughly encouraged and facilitated by State and national governments. Such commissions, boards or bureaus as are necessary should be organized to promote this work in each locality, each industry and among all groups, not overlooking that most important and most numerous group—the workers.

"We have a fuel conservation director and board, we have a food conservation director and board; why not a labor conservation director and commission?"

Col. A. D. Kniskern, in charge of the quartermaster's depot, at Chicago, told of the immense quantities of materials, foodstuffs, etc., handled at the depot, of the great care in inspection and the problems of handling. He said the depot, since the entrance of the United States into the war, had grown from 35,000 sq. ft. and a force of 3 officers and 40 civilian employees to its present floor space of 1,200,000 sq. ft., with 1,280,000 sq. ft. more building, and a force of 96 officers, 300 inspectors and 2500 civilian employees.

Employing Women Successfully

John T. B. Rheinfeld, Packard Motor Car Co., Detroit, speaking at the round table session Friday morning, said his company had successfully made use of

negro labor in its heat treating department, and that women were employed to operate milling and drilling machines, inspection, as factory clerks, etc.; that men acted as instructors of the women, and that the morale of the departments in which they worked had much improved. They had found women much more satisfactory than foreign labor. Through the fact that they were doing Government work, drafted men who possessed skill had been allowed to come from the cantonments in Michigan and work on jigs and fixtures, etc., for Liberty motors, while the Navy Department had sent from the Great Lakes Naval Training Station several sailors, ensigns, mechanics and engineers to the Packard plant with a view of their becoming familiar with the Liberty motor. His company did not believe in exploiting women, Mr. Rheinfeld said, but male help was scarce. They require women to wear caps while operating drill presses.

Douglas C. McMurtrie, director Red Cross Institute, New York, said that following previous wars maimed soldiers on their return home had never been properly cared for. The best hope held out to them was a pension, hardly sufficient for them to live on, yet often sufficient to keep them from helping themselves.

With the aid of scores of lantern slides Norman A. Hill, general manager, Carriage Factories, Ltd., Toronto, Canada, explained what is being done, and how, in Canada and abroad, to make independent and self-supporting the returned cripples from the battlefield. Such men are not only made self-supporting, but are made useful members of society. In part, Mr. Hill said:

Estimates Probable Number of Cripples

"There are at present approximately 13,000,000 wounded and crippled soldiers in the belligerent countries of Europe. In Germany alone, it is reported, 500,000 men are under treatment in the hospitals.

"During the next few months the return of wounded, crippled and invalided men from the overseas forces of the United States will begin and will continue thereafter for an indefinite period until the return of the overseas forces after the termination of the war.

"Without taking account of more remote contingencies, it seems not improbable that 100,000 disabled men will be returned during the first year of fighting and that at least 20,000 of these men will require total or partial vocational re-education in order to overcome handicaps incurred in service.

"A second year of fighting may add 40,000, a third 60,000 to the number requiring such re-education, making a total for three years of fighting of 120,000. This assumes 1,000,000 men overseas the first year and an increase of 1,000,000 overseas in each succeeding year.

"What the vocational board is planning for the disabled soldier and sailor is, first, the general program, and second the special educational problems. The offices of the surgeon-general of the army and the navy have charge of the disabled men so far as their physical rehabilitation is concerned. The labor department has taken up the matter of placing these men in industry. The bureau of war risk insurance is charged with the insurance phases of the matter; and so on. Through inter-departmental conferences all these boards, commissions and agencies have been searching out every possible item in the necessary program, and when comes the final drafting of the legislation it will have at hand information upon the problem from every angle and every corner of the globe.

"It will be the plan to re-establish skilled men in trades at which they worked before the war, for the reason that the ranks of skilled labor will be depleted and there will be no supply of skilled men available after the war from Europe, as every country in the war is experiencing and will continue to experience a great scarcity of skilled labor."

"Canadian experience so far indicates that at least 90 per cent of the returned soldiers can go back to their former occupations. There are now approximately 4000 returned men undergoing re-education and vocational training in Canada, out of some 12,000 which the commission has in its various institutions. Of this 4000 about 1000 are preparing for different trades or occupations than the ones they were in before enlisting. These men under vocational training have sufficient pay allowances to provide for them during instruction. These vary from $46 a month for the single man, up to about $120 a month for the married man with a large family."

At the banquet held Friday night, an address was to have been made on the "First Steps in the Solution of the Crippled Soldier Problem," by Major Frank B. Gilbreth, E. O. R., but he was ill. Lew R. Palmer, acting commissioner of the Pennsylvania Department of Labor and Industry told what that state is doing preparatory to caring for its men who return maimed or crippled. Pennsylvania was a pioneer in this direction.

Pennsylvania's Plans for the Maimed

Up to the present time, Mr. Palmer said, the restrictions imposed on the employment of women in Pennsylvania have not been changed, as to hours or conditions of labor. He read the following message to the Pennsylvania Department of Labor and Industry, written from "somewhere in France" by Major John Price Jackson, whose place he now holds:

"I hope, for the sake of the democracy of the world and our boys at the front, that the employees and the employers of Pennsylvania with your energetic aid are taking such a broad-minded and patriotic stand that cessation of work through strikes is a thing of the past. I appreciate fully that this requires as much, or maybe even more sacrifice from employers than from employees. The employer who does not deal generously with the employees in these times of high cost of living, and then berates his employees because they strike, and calls them unpatriotic is a very bad citizen, while the employees who demand, merely because they have the power, more than is just, are equally to be condemned."

Referring to the work of the Bureau of Employment of the Department of Labor and Industry, Mr. Palmer said: "In the office of the clearing house of the bureau at Harrisburg, there are at this instant, extensive card files showing accurately where more than 30,000 soldiers and sailors, handicapped physically from wounds or disease in war service may obtain employment in Pennsylvania's manufacturing establishments." He told also of other activities such as stimulating interest in city planning, work on the solution of the housing problem, accident prevention, catastrophe relief, etc., then said:

30,000 Places Waiting for Soldiers

"Pennsylvania was, I believe, the first state to cooperate definitely and actively with the office of the surgeon general in the plan to rehabilitate crippled soldiers and sailors and to aid in placing them at suitable industrial tasks. Last fall Major Mock came to Harrisburg to speak before employers, employees and representatives in the Fourth Annual Welfare and Efficiency Conference conducted by the Pennsylvania Department of Labor and Industry. The argument of Major Mock at that conference made it obvious to the officials of the department that it could perform a great work in Pennsylvania through its Bureau of Employment and Division of Hygiene and Engineering by making wide inquiry through the 30,000 industrial establishments of the state to determine where suitable employment might be obtained for soldiers and sailors crippled in war service, but reconstructed and re-educated by the national authorities. In January of this year, 30,000 printed questionnaires were sent to employers in all sections of the state. The purpose of the questionnaire was to ascertain the positions then held by disabled men in the state, a study of which would enable the Government to train the soldiers disabled in war. The questionnaire also requested employers to indicate the number of handicapped men they could employ, pointing out that each disabled soldier or sailor will be equipped with every suitable appliance by the Government to bring his efficiency to a maximum, and that he will receive the necessary treatment and training to adapt him for selected employment. The main questionnaire designated twenty-one classes of disability which might handicap the soldier or sailor when the

time came to place him in industrial work. These range from loss of one or both of the upper extremities, in full or in part; stiffness of upper extremities, in full or in part; loss of one or both lower extremities, in full or in part; blindness of one eye or both eyes; deafness of one ear or both ears; loss of speech; repulsive facial disfigurements; hernia or general health impairment which would prevent heavy manual labor."

"When the complete questionnaire form was sent to Pennsylvania employers, it was with the thought that functional rehabilitation of the injured soldiers and sailors and the occupational re-education and training for the old or the new position would be performed in every case by the national authorities. It was believed that the re-employment of the re-constructed man was the factor of the problem on which the Pennsylvania Department of Labor and Industry would be principally concerned. Of course, the degree of success attaining the solution of the whole problem demands a systematic and harmonious co-ordination of all related forces.

"It was realized that the questionnaire would fall on comparatively new soil. Employers as a class had probably given little thought to this important subject. I firmly believe, however, that we have awakened and are further awakening Pennsylvania employers to a realization of this vital question in a way that will insure avoiding the mere shunting of crippled men into the by-product occupations of industry.

"Returns from this questionnaire, tabulated up to March 1, indicated 30,710 potential placements for cripples in Pennsylvania industrial plants, and replies are still being received. If, even at this time, the office of the surgeon general desired employment for men having lost both legs at the hip joint, the Pennsylvania Department of Labor and Industry could from its present records indicate 46 places for such workers at tasks varying from baker to draftsman, glass cutter to bench hand machinists, reed and willow worker to sorter or weaver in a textile plant. Of course, I am fully aware that even with the work already done in Pennsylvania, only the first step in the project has been begun. I feel, however, that we have broken the ground and that the questionnaire will finally be the basis from which further intensive and individual surveys as to occupations for cripples may be met.

"Pennsylvania has, however, within the last two weeks instituted as a commonwealth, the formulation of preliminary plans for the physical restoration, educational training and proper placement, in industry, of disabled Pennsylvanians returning from war service. Governor Brumbaugh, on March 19, appointed a state committee comprising the Adjutant General as chairman, the Commissioner of Health, the Commissioner of Labor and Industry and the Executive Secretary of the State Board of Education to study, in all its phases, the entire problem of rehabilitating crippled soldiers and sailors in Pennsylvania, and which will place every facility and all its co-operative bureaus at the service of the national authorities engaged in this work. Offers of such co-operation already have been presented to the Surgeon General.

Two New Forms of Circuit Protection Apparatus

The Automatic Reclosing Circuit Breaker Co., Columbus, Ohio, has recently brought out an improved form of circuit breaker and a reverse current relay. The former is designed particularly for protecting motor circuits in mines and industrial plants and is provided with a low voltage lock-out arrangement, which is relied upon to prevent the breaker from reclosing after it has been opened either by an overload current or failure of the voltage until the trip coil has been operated.

The relay is of the circuit opening type, and is designed so that it will operate either when the direction of the current is reversed, or the voltage falls to an abnormally low value. The relays which are designed for mounting on the rear of the circuit breaker panel, are held closed by a polarizing coil connected in series with a high resistance. When it is desired to close the relay after it is operated, the high resistance is temporarily short-circuited by a push-button switch.

HOUSING WORKERS

Director Eidlitz Urges Communities to Help Solve the Problem

WASHINGTON, April 2.—The money to be appropriated by Congress for the housing of workers in munition factories will not be expended at any plants where living accommodations can be secured by any other possible means, according to a formal statement issued here by Otto M. Eidlitz, Director of Housing and Transportation of the Department of Labor, under whose supervision the funds granted by Congress will be disbursed. Mr. Eidlitz emphasizes the duty of each community to solve its own problem and to provide housing without calling upon the general Government, and insists that every expedient should be exhausted before making a draft upon the Federal appropriation.

"It is a matter of much concern to all Governmental departments interested in housing," says Mr. Eidlitz, "that the various communities are getting a wrong idea as to the intent of the Government in connection with relieving the demand for housing in various communities.

"Communities should realize that, due to the high cost of building materials and labor, housing generally throughout the United States has been inadequate to meet even the normal growth of the various localities, and of course the introduction of war work has accentuated this situation. However, it must be remembered that our situation is an emergency one, and that each community must do its utmost in the way of providing homes for industrial workers engaged on war work, through inducing those who did not formerly take in boarders to open their homes during this war emergency to these war workers.

"Furthermore, if there are any available houses or institutions which could be readily converted into reasonable housing for workers, this should be done.

"Again, if workers can be induced to come from outlying towns or hamlets, and transportation can be improved to enable these workers to reach the industrial plants in the locality affected, this method should be employed. It may happen that a reasonable amount of temporary buildings may be introduced to meet the emergency and take the peak load.

"In any event, new houses will not be considered until every other means has been exhausted.

"It is also of vital importance to determine whether the products of the particular locality are immediately needed in the war program, and the order of their importance.

"From all of which it must be realized that every community that can take care of itself should make every effort to do so before seeking governmental aid, especially as the demand for relief is very much greater than the funds provided to meet it.

"If a community is benefiting through the fact that war orders are being placed among its manufacturers, and indirectly through the fact that a larger population is spending its earnings in that particular community, it is not unreasonable to ask that the community itself, in this war emergency, shall make an effort to help itself. There is reason to believe that, where a community is overloaded with war contracts, its chances for receiving additional governmental contracts is remote, as it naturally would be useless to offer additional contracts to a community whose manufacturers are already unable to find housing for their workers."

The Indiana Coke & Gas Co., Terre Haute, Ind., will make an extension to the present by-product coke plant. It has contracted with H. Koppers Co., Pittsburgh, for the erection of 15 Koppers ovens with the necessary additions and changes in their present equipment to accommodate this increase in the plant. The addition of 15 ovens is so arranged that a second group of 15 ovens can readily be installed. The surplus gas is distributed in Terre Haute for domestic purposes, and the coke is sold for domestic and metallurgical uses.

Relying on Heavy Artillery and the Bayonet

Classes of Guns Which We Shall Use on Western Front—Production of Field Artillery Already Half That of France

WASHINGTON, April 2.—In pursuance of its recently adopted policy of making public the salient features of current war preparations so far as it can be done without disclosing military secrets of value to the enemy, the Ordnance Bureau of the War Department is now manifesting a commendable disposition to furnish the public, and especially the manufacturers of the country, some basic information concerning the problem upon which the bureau is now working in the procurement of heavy artillery. Congress was asked a few days ago to appropriate no less than $400,000,000 in the form of an amendment to the pending deficiency bill, and even greater sums will be called for in the not far distant future.

It is an extraordinary fact, the ordnance experts point out, that heavy artillery and skill in its use, to which Napoleon owed his great success a hundred years ago, is the dominating factor in the present struggle for world supremacy, although the bayonet is of almost equal importance. While many people have been looking forward with fervent hope to the production by American genius of some unique engine of warfare, military experts count upon no such development. Although we have devised many unique articles of equipment for the offensive and for the preservation of human lives, heavy artillery and the bayonet are still relied upon to win the war.

The airplane as a scout or as a protecting screen against the enemy should not be underestimated, but at its best it is only a necessary adjunct to the artillery. Its individual importance as a weapon of destruction is too uncertain at the present stage of development to entitle it to rank as an offensive weapon with heavy ordnance.

It is now possible with propriety to give to the public a brief descriptive statement of the classes of guns which the War Department is now planning to use on the western front. Modern artillery is divided into two classes, namely, mobile artillery, which includes all guns used in the field, and seacoast artillery, which is used in fortifications on stationary mounts. Interest now is centered in mobile artillery for offensive work on the French front, and this class of ordnance is again divided into three distinct types, namely, guns, howitzers and mortars.

Guns

Under the general head of guns there may first be taken up long range rifles distinguished by high muzzle velocity and long barrels of from 30 to 50 calibers, and having a range of from 6000 to 30,000 yd. with a low angle of fire. Guns of this type are classified as wheel-mounts, anti-aircraft (truck mounts), emplacement-mounts and railroad-mounts. The wheel-mounts are subdivided into pack artillery or mountain guns transported on pack mules; field guns drawn by horse teams and attached to rumbles; motorized field guns drawn by big ammunition trucks; tractor-drawn guns of large caliber, and the so-called horse artillery drawn by horses with all the cannoniers mounted for fast field work in support of cavalry.

The wheel-mount guns include the famous French 75-mm., approximately 3-in. caliber and the 4.7-in. guns which have been responsible for breaking down the greatest military offensives of the Teutonic armies in the past three years. The 4.7-in. are of greater range and caliber but of practically the same type as the 75-mm. Next in point of size come the 5-in. and 6-in. seacoast guns such as our Allies have withdrawn from fortifications and mounted on improvised wheel-mounts for use as mobile artillery.

The anti-aircraft guns are 75-mm. and 4.7-in. weapons, specially mounted on carriages which will allow an elevation of about 85 deg. and a transverse of 360 deg. set up on a motor truck.

The emplacement mounts are large caliber guns that are partially mobile. They are taken apart and moved around in sections on tractors as needed and set up in concrete emplacements and are more strictly speaking siege guns.

The railroad-mount guns are converted seacoast and naval long range rifles from 8 to 14 in. Their mount consists of a specially designed carriage on a railroad car and, due to their extreme range and accuracy, they are operated far back from the front lines over the heads of our own troops.

Howitzers

The howitzer is distinguished from the rifle by a low muzzle velocity ranging from 1200 to 1900 ft. per sec. and a short barrel approximately 18 times the caliber of the gun. These weapons develop a range at a high angle fire of from 10,000 to 23,000 yd. The howitzers most commonly used are the 155-mm., the 8-in., the 9.5-in., the 240-mm. and finally the famous 16-in. howitzer of which so much was heard during the early days of the war when the Germans, who first employed them, destroyed the fortifications of Liege. The smaller sizes, such as the 155-mm. and the 8-in., are used chiefly for field work, but also for the bombardment of permanent fortifications.

The chief advantages possessed by the howitzer are lower cost of manufacture, cheaper ammunition and longer life. Indicative of this, the life of a howitzer of the same caliber as a gun would be approximately two-thirds greater. They are not so accurate and do not possess such long range as guns and consequently are not adapted for all work.

Mortars

The mortar is distinguished from the howitzer by even lower muzzle velocity, ranging from about 480 to 2000 ft. per sec. and a length of barrel of about 10 calibers with a range of from 2500 to 15,000 yd., this extreme range being obtained by a very high angle of elevation. The common French type is the 240-mm. mounted on a railroad carriage.

With the exception of the light 75-mm. field guns, practically all of our artillery is motorized and about 10 per cent of these light guns are drawn behind the ammunition trucks. As indicative of the tremendous amount of material included in a regiment of 75's, it is interesting to know that there are approximately 300 vehicles exclusive of the actual fighting material of each regiment. These vehicles include trailers, tractors and artillery repair trucks and supply trucks. In the actual fighting material there are 24 guns, 36 caissons, 60 limbers, in addition to carts for the field telephones, making a grand total of approximately 430 vehicles to a regiment.

Cost of the Artillery Mobilization

An idea of the comprehensive manner in which the mobility of the American ordnance has been obtained may be gathered from the fact that the estimated cost of the mobilization of the artillery for the United States Army is $500,000,000 of which approximately $210,000,000 had been expended by Feb. 1. Ammunition trucks and vehicles are being completed faster than they can be shipped. The enormous sum of $776,000,000 has been expended by the Procurement Division of the Ordnance Department in the purchase of projectiles to the number of 65,000,000, including shrapnel, high explosive shells, gas and anti-aircraft shells for howitzers and guns. These projectiles weigh from 1200 to 1700 lb.

and cost from about $10 to $125 each, exclusive of the cost of the explosives or of loading the complete round.

As the result of more than three years active experience, the Allies have been able to perfect many of the minute details which are so important in the effectiveness of a field gun. It is, therefore, believed that the War Department has pursued the right course in adopting 75-mm. and 155-mm. guns of our own design, although of calibers making it possible to use the same ammunition as that employed by the Allies.

Scale of Our Production

The speed with which the preparations of the Ordnance Department have been pushed forward can only be appreciated when the magnitude of the task is fully understood. Notwithstanding the great advance made by the Allies and the manufacturing capacity acquired by them before the United States was drawn into the war, it is a significant fact that as the result of the efforts of our observers at the front and of the ordnance office at home we have to-day reached a production of field artillery which is equal to 50 per cent of that of France and upon which no less than $210,000,000 had been expended up to Feb. 1.

For three and a half years this Government has maintained a large staff of military observers on all the fronts of Europe and it has been their duty to secure all possible information concerning the experience of the belligerents so that our own forces could be supplied with the best possible equipment with which to meet the enemy. It is well known in military circles that British, French and Italian artillerists do not entirely agree in their theories as to the proper construction of artillery and the control of artillery fire; hence it has been the duty of our observers to distinguish the best points of each method so that they can be incorporated in our own practice with the result that the foreign military observers in this country, one and all, admit that the artillery which will be supplied to the American troops by our arsenals and private munition plants will be unsurpassed by anything used on the front.

W. L. C.

All Ready for Third Liberty Loan Campaign

Thorough Organization to Insure Success—Special Effort Will Be Made to Increase Number of Subscribers to Bonds

REPORTS from all parts of the country indicate through preparation for making the third Liberty loan a great success. A special effort is to be made to increase the number of subscribers. Secretary McAdoo has expressed the hope that the third loan would be taken by at least 15,000,000 subscribers. The first offering was absorbed by over 4,000,000 investors, and the second by more than 10,000,000. In the New York district there will be an army of 300,000 workers, many of whom have had experience in the two preceding campaigns. The commander-in-chief will be Benjamin Strong, Governor of the Federal Reserve Bank of New York, and with him will be associated such men as J. P. Morgan, Jacob H. Schiff, George F. Baker and Frank A. Vanderlip. As usual, the machinery and metal working trades in New York will be thoroughly organized. One town in New Jersey, Bernardsville, has already reported that its quota has been over-subscribed 50 per cent. It aims for an oversubscription of 500 per cent.

The Allotment

Subscription goals which each Federal Reserve district will be expected to reach or pass during the campaign, opening April 6, give the New York district 30 per cent of the $3,000,000,000 loan total, or $900,000,000, as its share, the same as in the second loan. The Chicago district is allotted 14 1/6 per cent or $425,000,000, and the Cleveland district 10 per cent, or $300,000,000.

In calculating the wealth and general business conditions of various districts as the basis for the quotas it was found Boston had been given a disproportionate share in the second loan, and the district's percentage has been reduced from 10 to 8 1/3 per cent. Cleveland, Minneapolis and San Francisco were given the same proportions as in the second loan, and other districts were raised slightly.

Quotas by districts are as follows:

Third Liberty Loan

	Per Cent	Quota
Boston	8 1/3	$250,000,000
New York	30	900,000,000
Philadelphia	8 1/3	250,000,000
Cleveland	10	300,000,000
Richmond	4 1/3	130,000,000
Atlanta	3	90,000,000
Chicago	14 1/6	425,000,000
St. Louis	4 1/3	130,000,000
Minneapolis	3½	105,000,000
Kansas City	4 1/3	130,000,000
Dallas	2 2/3	80,000,000
San Francisco	7	210,000,000

The goals of each state, county and city will be determined by Federal Reserve district committees on the basis of population, wealth and business conditions. These will be announced locally.

Liberal Terms Allowed

The Standard Parts Co., Cleveland, conducted a very successful Liberty loan campaign among the employees of its various plants when subscriptions were received for the first two loans, and a similar plan will be followed in obtaining subscriptions for the third loan. The loan campaign was in charge of a committee consisting of the head of the production department and assistant general manager, auditor, secretary and various plant managers. The general details were worked out by this committee, and it was left to each plant manager to have supervision of the campaign in each plant.

Before soliciting subscriptions shop meetings were held which were addressed by good outside speakers, who stirred up patriotism and aroused the enthusiasm of the employees. After the efforts in this direction had been accomplished a canvass of all the employees was made by the foreman in each department. As soon as a man expressed his willingness to subscribe to the bond issue he was sent to the plant office, where he attached his signature to a subscription blank and the company furnished him with a button, which indicated that he was a bond subscriber. Liberal terms were allowed the men. On a $50 bond they were required to make a payment of $1 down and $1 per week. The company agreed to refund the payments of any man who left its employ. Bond subscriptions were secured from around 80 per cent of the men.

The Investment Argument

President Lewis Muench, Republic Chemical Co., Pittsburgh, says that before starting the campaign among the employees of his company for the second Liberty Loan, he made up his mind that it would be well not to have any outsiders do any soliciting in the plant, as he believed that officers and fellow workers would have more influence with the employees. Mr. Muench says that the substance of what he told the men was this:

> That never before in their experience as wage earners had they earned as high a rate of wages, and never before had they ever had the opportunity of working full time from one end of the year to the other. Therefore, this was their

golden opportunity of laying something aside for that rainy day that is apt to break in on them at most any time, and to think of their wives and children, and their old mothers, to whom they owed duties and responsibilities for their subsistence. I realized that perhaps many of them had had sad experiences in investing their hard-earned savings in worthless securities through some unscrupulous and false friend, and that such experiences might have discouraged them from laying any money aside. But that now the golden opportunity was offered to them to invest their savings in the best securities that the world had ever offered, and that was in United States Liberty bonds, with a rate of interest higher than what any savings bank with any reasonable assurance of security could afford to pay them. I illustrated to them that a $50 Liberty bond was just as secure and just as negotiable as a $50 banknote, the security which none of them had ever or would ever question. But that the $50 banknote did not bear interest; in other words, to make it plainer to them, did not get young ones; whereas with a $50 bond, at the expiration of every six months they could cut off a little coupon worth $1, which they could again reinvest, and within the period of 20 years they would have saved up the amount of another bond, but if they did not want to save the money they could cash this coupon in any store and buy a nice little present for their wives or their children, and at the same time they would retain their original investment of $50. I further told them that any time when they had reverses, sickness in the family, or were out of funds and needed money, they could turn their bond into cash at any bank in the United States. I impressed upon the men's minds that they were really not doing the Government as great a favor as themselves by investing their savings in these Liberty bonds, because they themselves were the beneficiaries. They were not giving their money to the Government, as the war taxpayers had to do, but they were investing it in an absolutely safe security, at a very liberal rate of interest. If, on the other hand, they did not see fit to assist our Government in carrying on this war for the freedom of the oppressed and for world-wide democracy, then our Government will have to get their contributions by levying a tax on their earnings, which, of course, would mean an outright expense to them. I impressed upon them the advantages and blessings they enjoyed in America, as against the countries where they formerly lived, and which they left for the purpose of improving their conditions. And I impressed upon their minds that they practically had to pay no taxes here, and yet their children received a better education without any cost to them, than they could get anywhere else in the world.

Printed Matter Used

In addition to this personal appeal, we distributed printed matter that was furnished us by the local committee in seven or eight different Slavish languages, and as a result of our appeal we secured subscriptions from about three-fourths of our men, which was far in excess of my fondest expectations. Our company finances our men's subscriptions by collecting from them $4 on every fortnightly pay day on a $50 bond, and $8 on a $100 bond, without charging them any interest and delivering the bonds to them as fast as they pay up, and the men enjoy the interest on the bonds from the date they were issued. They are still paying off these subscriptions, and will get through with them by April 15, except a few to whom we have granted extensions. There have also been quite a few who left our employ and who demanded their partial payments, and which, as a matter of course, we surrendered to them. A few others had some hard luck stories to tell us and could not keep up their payments and demanded the money which they had already paid, and which was turned over to them. Our company takes over all such bonds on which the subscribers have canceled their payments.

Good Results Expected

As far as our own men are concerned, we do not know of any better methods or any more forceful arguments that we could use in our appeal to them for subscriptions to the third Liberty loan. I believe that one great blessing that will result, particularly to the laboring class, out of these bond issues is the education to economy and thrift, and I believe a great many of the working men who have formerly spent their spare money foolishly will now acquire a taste and habit for saving, because they will find that a Liberty bond is a great safeguard against misery and suffering. They will find that a Liberty bond can easily be turned into money, if needed, and in the meantime, they will enjoy the blessings of such savings by getting the regular return of interest on their money that they have put aside. While these blessings have not yet been pronounced on account of the short time since the first Liberty bonds were issued, yet I think that with many of them the possession of some of the first issues will create a desire to buy some more, and thus they will keep on saving, and will invest these savings in future issues. They have probably found out that with the present sizes of their payrolls they can afford to put a little money aside out of each pay envelope without sacrificing any of their customary modes of living, and based upon that experience, I am in hopes that the working classes of our country will subscribe more liberally to the next issue of bonds, and that our fondest expectations may be exceeded.

How to Avoid Cancellations

CLEVELAND, April 1.—Plans have been completed for the third Liberty loan campaign in industrial plants in Cleveland, which will be conducted very similarly to the second loan drive. The entire campaign in this city will be in charge of two or three main selling committees, one of which will supervise the work in manufacturing plants and commercial houses. Under this industrial sales committee will be a group of 60 salesmen which will be assigned to manufacturing plants, taking in every plant in the city. Instead of dividing the city into territories among these salesmen, men will be assigned to plants that they are best qualified to look after.

The actual campaign of soliciting subscriptions will be left to the men in the plants. The work of the 60 salesmen under the main committee will be to secure the co-operation of the plant managements, supply information regarding terms of payment, accounting, methods followed in campaigns conducted in other plants that might be of assistance, and to supply the plants with literature, posters, etc. A corps of 40 to 50 speakers will be provided who will visit the various plants and address the workmen. These will be men who had experience in the previous Liberty loan drives.

In some plants there were a large percentage of cancellations of subscriptions after the previous loan campaigns, and in others these cancellations ran as low as 3 per cent. The Cleveland committee considers that where there was a large number of cancellations the men were not sold in the first place but simply told to attach their signatures to an order for bonds. The committee in this campaign will endeavor to arouse a man's patriotism and interest and have a sale actually made in addition to securing the man's signature. It believes that by following this plan there will be a much smaller percentage of cancellations.

During the second Liberty camgaign there were 77,000 subscriptions in industrial plants in Cleveland. The industrial sales committee hopes to secure over 100,000 subscriptions from industrial workers in the third Liberty loan campaign.

Book Review

Quin's Metal Handbook and Statistics for 1917.—Compiled by H. L. Quin. Pages 237, 4 x 6 in. Published by the Metal Information Bureau, Ltd., 7 East India Avenue, London, E. C. Price 3s. 6d.

This is the fifth annual compilation of British, American and other statistics on the iron and steel and metal trades by Mr. Quin. It gives for 1917 the production, prices, exports and imbports of iron and steel and the various non-ferrous metals, also of tin plates and galvanized sheets. The war has cut seriously into all statistical work and some countries which were formerly included in all international metal statistics are now entirely unrepresented. At the same time the developments of the war have made of great value such statistics as Mr. Quin has brought together. In respect to copper and some other non-ferrous metals the data are particularly full.

"Iron Ore Occurrences in Canada" is the title of a publication in two volumes sent out by the Mines Branch of the Canadian Department of Mines. It has been compiled by E. Lindeman and L. L. Bolton, with an introduction by A. H. A. Robinson. Volume II is devoted to descriptions of iron ore occurrences accompanied by a copious series of maps in color.

Seven Lake Superior Mesaba ores, three Bessemer, three non-Bessemer, and one non-Bessemer ore from the Cuyuna range are listed in the 1918 iron ore analysis book of the Tod-Stambaugh Co., Cleveland. This company's ore book shows no changes from the ores listed in 1917.

Wage Conditions in Pittsburgh District

PITTSBURGH, April 2 (*By Wire*).—As yet the blast furnace and steel companies of the Pittsburgh district have made no official announcement as to whether they will grant the 15 per cent advance in wages announced last week by the Steel Corporation on blast furnace and steel works labor to go into effect on April 15. The Youngstown and Wheeling blast furnace and steel companies, however, have announced that they will make an advance in wages identical with that of the Steel Corporation. In the Youngstown district the advance in wages will affect upward of 50,000, the Youngstown Sheet & Tube Co. alone having on its payrolls at present about 17,500 men.

The present rate for common blast furnace labor is 33 cents per hour for a 10-hr. day, and the advance of 15 per cent will make the rate practically 38 cents an hour, much the highest rate of wage ever paid in the history of the steel business for common labor. The advance does not affect puddling, sheet or tin plate labor, which is fixed on a sliding scale, based on sales prices. Nearly all industrial plants are short of men, and when the second army draft comes this shortage will no doubt be still more acute.

Pacific Coast Steel Plant Extensions

In accordance with the recommendations of Frank I. Ellis, an engineer who has been inspecting the mills of the Pacific Coast Steel Co. at South San Francisco, this company will shortly commence improvements which will aggregate $300,000 in cost. A 28-in. rolling mill for the rolling of angles, beams and channels is included in the additions to be made, and other alterations are being planned. Improvements in the open-hearth department include the building of an additional 40-ton furnace and the converting of the two 25-ton furnaces now in use into 40-ton capacity units. This will give the company four 40-ton and one 35-ton open-hearth furnaces.

As fast as these units are installed further additions are to be made, the plan of the company being to build a six mill sheet mill on its recently acquired property bordering on Swift Avenue. This mill will have a capacity of approximately 3000 tons per month. Future plans include the construction of more open-hearth furnaces, a large blooming-mill and improvements to bring the output up to 20,000 tons monthly. Nearly 80 acres of ground will be covered by the buildings and equipment of the mill when the work is finished.

Fuse Makers in Session

The American Fuse Manufacturers' Association is in session at Cleveland discussing ways to better the trade, and in some cases to speed up production. The association, composed of munitions manufacturers, was organized at the request of Major B. A. Franklin, chief of the Ordnance Bureau of the United States army, to centralize the work so he can be in direct touch with the industry at all times.

A change in the control of the Buckeye Twist Drill Co., Alliance, Ohio, has been effected through the sale of the controlling interest in the company by E. D. Rogers, Cleveland, who has been president, to O. F. Transue, Frank Transue and F. E. Dussel, of the Transue & Williams Steel Forging Corporation, Alliance; W. H. Purcell, of the Alliance Machine Co., and H. R. Jones, of the United Alloy Steel Corporation, Canton. Mr. Jones, who still retains a minority interest in the company, has retired from the presidency, being succeeded by O. F. Transue. Mr. Dussel has become secretary and treasurer, succeeding J. D. Rogers, son of the former president, who has been commissioned as second lieutennt in the army, and is now located in Washington.

The Honolulu Iron Works, Honolulu, Hawaii, has filed authorization charter in New York, with capital of $5,000,000. D. A. Fox, 233 Broadway, is representative.

SHIPS PURCHASED

Government Obtains Japanese Tonnage in Exchange for Steel

WASHINGTON, April 2.—As the result of negotiations which have been on foot for nearly a year, arrangements have finally been concluded between the United States and the Government of Japan representing certain Japanese shipbuilders for the purchase of 12 Japanese ships, aggregating approximately 100,000 tons deadweight capacity, which will be added to the fleet of the United States Shipping Board within the next few months. In return for the sale of the ships, the War Trade Board, it is officially announced, has agreed to deliver the Japanese shipbuilders a corresponding amount of steel for shipbuilding, chiefly plates, ton for ton against delivery of the ships. Further negotiations are in progress to secure from Japanese shipbuilders 200,000 additional tons of new construction, the ships to be built in return for new steel placed at the disposal of the builders by the War Trade Board.

All of the 12 Japanese vessels secured by the United States are large modern steamers of 6000 tons or over, with one exception, and none is more than two years old. Four of these vessels, though launched, have not yet been finished. Deliveries of the ships at American ports are to begin in May and the last one is to be turned over in September. In order to insure the prompt turning over of these vessels, a progressively higher price per ton, according to the month of delivery, is to be paid as a premium on early deliveries.

No statement is to be had here concerning the prices to be paid for these ships, but it is understood that they will be somewhat in excess of the average contracts made in this country by the shipping board. Throughout the protracted negotiations, which have just been concluded, the obstacle in the way of prompt agreement was the excessive price demanded by the Japanese for the vessels. The unwillingness of the shipping board to pay heavy premiums for the Japanese ships not only blocked the deal but prevented the exportation of large quantities of steel plates which had been warehoused at Pacific ports in the expectation of early shipment to Japan. Some of this steel is understood to have been diverted to other purposes, but it will now be promptly replaced. According to information obtained here, the plates are being supplied to the Japanese shipbuilders on a basis equivalent to the current schedule of controlled prices for iron and steel.

The War Trade Board, in an official statement, predicts that the additional transfers of Japanese ships now in contemplation will soon be made and adds that "recent editorials in such papers as the Jiji Shimpo, of Tokio, show an encouraging disposition to regard the furnishing of tonnage for allied war needs in the light of a patriotic contribution to allied war purposes, and with this spirit prevailing a quick and reasonably satisfactory result from these negotiations is hoped for."

The United States Coal & Coke Co., a subsidiary of the Steel Corporation, will make an expenditure of about $4,000,000 in the development of about 30,000 acres of coal lands owned by the company on the Louisville & Nashville Railroad in Harlan County, Ky. This is designed to be one of the largest developments of coal lands ever undertaken in that State. A modern town is now being built to accommodate 6000 persons, and already 1700 employees are at work in the coal mines and engaged in building the new town. All the work is being done by the United States Coal & Coke Co. itself, and the houses being erected will be modern throughout and have all modern conveniences. This will be a strictly coal-mining proposition and the company expects eventually to produce from 10,000 to 12,000 tons of coal per day. The output of coal at the start will be much smaller, and it will all be used in the manufacture of by-product coke at the various coking plants of the Carnegie Steel Co. and other interests of the Steel Corporation.

Priorities on Iron and Steel Products

Washington Committee Recognizes the Need of Manufacturing for Stock, and Under Certain Conditions Grants Such Permits

WASHINGTON, April 2.—While there can be no doubt that many manufacturers are suffering great hardships as the result of the discrimination in the issuance of priority orders in favor of producers having Government contracts, there is good reason to believe that conditions can be materially ameliorated in many cases by a full and frank presentation of the facts to the Priorities Committee of the War Industries Board. Although this committee, like every other branch of the Government service, is now bending its energies to the winning of the war and measures the desirability of every action by the criterion of war serviceability, it is also mindful of the general welfare of the industries of the country and is seeking especially to avoid injury to the interests of producers who, while having no Government contracts, may nevertheless be working on material which the Government will ultimately be required to use.

Government Needs Stock Products

There now exists a very broad "twilight zone" which includes a large number of manufacturers whose products, while obviously not to be embraced in the non-essential class, are not necessarily to be employed directly as war material. These producers, a number of whom have brought their difficulties to the attention of THE IRON AGE, are making iron and steel products for stock or to replace material purchased by the Government or to supply other parties holding Government contracts or sub-contracts. In many cases it is difficult, if not impossible, for these producers to show that the Government has any interest, direct or indirect, in their output, and yet in the aggregate their products must constitute a very large proportion of the stocks upon which the Government is constantly relying for open market purchases. The tremendous consequential as well as intrinsic value to the Government of spot merchandise is recognized by every official agency having to do with buying, but the difficulty of devising a system for treating fairly manufacturers in the twilight zone without opening wide the door to every producer of non-essentials is perplexing the ablest men in Washington at this time.

The vast scope of the priorities problem makes the task of Judge Lovett's committee not only of great magnitude but of infinite ramifications and technical complications. The difficulties in the way of establishing a definite policy are further increased by the fact that control of many of the principal products for which priority orders are sought has been vested exclusively in other departments of the Government which concern themselves more intimately with production and conservation than with distribution. Nevertheless, the Priorities Committee has painstakingly developed an organization in co-operation with half a score of other Governmental agencies and with the assistance of a corps of specialists under its own immediate jurisdiction is meeting with more than a fair measure of success in dealing with the present very difficult situation.

How the Priorities Committee Works

With a view to presenting briefly the policy of the Priorities Committee, as it has been worked out since its reorganization early in January, the correspondent of THE IRON AGE is authorized to state briefly the underlying considerations that move the committee in granting priority orders and to outline the system of co-operation between the committee and other federal bureaus charged with the supervision of commodities of importance to producers in the leading lines of industry. Because of the complete control accorded by the Lever act to the Fuel Administrator over the production and distribution of coal, coke, fuel oil, etc., applications for priority orders for fuel must necessarily be transmitted by the Priorities Committee directly to Dr. Garfield's office. Such transmission, however, does not end the responsibility of the committee, and in all cases where the applicants are apparently entitled to a degree of consideration which they do not receive within a reasonable length of time the committee takes the matter up with the officials of the Fuel Administration and seeks to secure a prompt adjustment.

The taking over of the railroads by the Government has complicated the question of transportation priority, but this also has been worked out and systematized in such a way as to produce very satisfactory results. Applications for transportation priority are referred to the Director General of Railroads but, as in the case of fuel, if applicants who are deemed to be entitled to prompt relief do not receive it, the committee puts itself in communication with the director's office and endeavors to obtain the desired order or to ascertain why it has not been forthcoming.

Pig Iron Distribution a Problem

For the handling of pig iron orders, which constitute a large proportion of the committee's business, a very competent organization has been provided. These orders go in the first instance to Jay C. McLauchlan, the committee's pig iron specialist, and he in turn is able at all times to confer with J. Leonard Replogle, director of steel purchases, whose knowledge of the industry is such that he is in position to make equitable recommendations in practically all cases. The problem of pig iron distribution is one of the most difficult with which the committee has to deal, not only because of the diversity of interests involved, but because of the impracticability, if not impossibility, of determining in many cases the ultimate destination of the material for the production of which the iron is to be used. The industry is fortunate in that these applications are handled by thoroughly practical men and not by over-zealous theorists.

Priority as to certain classes of material now works almost automatically. Munition makers employing toluol, for example, have been carefully classified, and as the Government has taken over practically the entire output of this product its distribution is effected with very little trouble. So, also, in the case of large carbon electrodes; inasmuch as there are but a very small number of producers of these articles and as the users thereof are in a well defined class, the committee experiences little or no difficulty in handling applications. The majority of the transactions in toluol and large carbon electrodes are taken care of between buyer and seller without reference to the committee.

Priorities on Some Products for Stock

In view of the constantly varying conditions found to prevail among manufacturers desiring priority orders who are not directly engaged on Government contracts, the committee has found it necessary to define its policy concerning certain aspects of the problem. It, therefore, has prepared in concrete form a statement of its attitude toward applications for material to be used for the replacement and maintenance of stocks, as follows:

The general policy of the committee is to decline to give priority for *replacement or maintenance of stocks*. Applications are frequently received from manufacturers or dealers who have depleted their current stocks by filling war orders. They ask priority for *replacement* but are not able to give assurance that the supplies, if furnished, will be used on war work, direct or indirect. Applications are also received from manufacturers and others for priority to *maintain* stocks; for instance, makers of small tools, manufacturers of railroad supplies and oil well supplies, etc. They are not able to quote any specific war orders, direct or indirect, upon

which the materials will be used, but state that it is necessary for them to maintain their stocks so as to be ready to fill rush orders from day to day in the usual course of business.

The committee, however, recognizes the importance of the maintenance of reasonable stocks of materials or articles necessary as component parts of work or goods to be carried out or supplied under orders or contracts to be executed under either Class A or Class B priorities, and also to maintain stocks of tools and supplies which cannot be manufactured on order, but must be drawn from by those engaged in war work or work of national importance. The specializing members have therefore been authorized, with the concurrence of the Rating Committee, to make exceptions to the general rule mentioned in those cases where in the better judgment of the specializing member and the Rating Committee assistance should be expended for the replacement or maintenance of stocks.

In addition to the above the correspondent of THE IRON AGE is in position to state that the Priorities Committee will at any time give careful consideration to representations that may be made by manufacturers concerning their needs in the way of material which, though not under actual engagement for war work, is of substantial importance to the industries of the country as a whole. Communications regarding such matters should be as full as possible and should state the facts with the utmost frankness and sincerity. The popular impression that the Priorities Committee is difficult to approach and therefore that visits to Washington are useless is quite erroneous. The committee's organization has been perfected to a degree that makes it practicable to secure appointments on comparatively short notice and to thresh out details in a highly satisfactory manner.

Machine Tool Priorities Intricate

No branch of the priority work has presented a more intricate problem or a more vital one than that of machine tool orders. There has been serious congestion and confusion in the schedules of the tool manufacturers caused by the excessive number of orders placed by the Allied Governments and foreign manufacturers, the several departments of our own Government and its various contractors and sub-contractors. It has been a difficult task, in this multitude of orders, to determine the relative importance of the need of the Allies for machine tools as compared with the need of our own Government and industrial plants.

The inability of the Allied War Missions to provide information as to the exact use to which any particular machine will be put abroad has presented a further complication. In most cases they have been unable to make a statement more definite than that "the tool is urgently needed for war work." This afforded no basis for determining in individual cases the urgency of the need abroad as compared with the need here. It has developed, however, that all machine tools imported into England and France are placed by the Government where they will be of the greatest use in war work—irrespective of the party for whom or the purpose for which they were purchased. The same close supervision has not obtained in Italy, although most of the Italian manufacturers ordering machine tools in the United States are so-called "auxiliary" establishments engaged almost entirely in war work.

The machine tool requirements of the Allies recently became so critical, however, that the Priorities Committee decided it would issue certificates of A-1 classification on all machine tool orders placed prior to Jan. 1, 1918, by England, France or Italy, for war work, even though the specific use was not stated, save in those cases where such rating would seriously interfere with very urgent war work for our own Government.

Study of the Machine Tool Situation

An intelligent determination of these priorities necessitated an intensive study of the schedule of practically every machine tool manufacturer with whom orders had been placed by the Allied Governments—some 200 in number. This work was begun early in January by experts designated by the Priorities Committee. One specialist has been in constant touch with the Allied War Missions the Machine Tool Section of the War Industries Board, the various departments of our own Government, and representatives of machine tool manufacturers. The task has not been completed but sufficient progress has been made to demonstrate the beneficial results. The objects to be attained in considering each schedule were: (1) determine relative importance of Allied orders among themselves and as compared with the orders for the United States Government and its war industries; (2) advise Allied Governments as to what delivery can reasonably be expected on each order, and (3) fix tentative schedule on which the manufacturers can work with reasonable assurance of not being interrupted. This has been of considerable help to the Government and the war industries, and has enabled the tool manufacturers to speed up their production.

Invaluable assistance in this work has been rendered by the Machine Tool Section of the War Industries Board, which has furnished the schedules and given expert advice on the particular orders. The same system of checking will continue in the handling of applications on foreign orders placed subsequent to Jan. 1, 1918. The war missions are now able to state more definitely the use which will be made of the machine, *i.e.*, for airplane work, gun forgings, etc.

The Priorities Committee has maintained the policy of keeping oil well supply manufacturers, railroad supply manufacturers, manufacturers of coal mining machinery, etc., furnished with a sufficient amount of supplies and raw material to enable them to produce reasonably adequate stocks from which the producers may draw. Obviously it is only practicable to provide for the manufacture of ordinary oil well supplies when and as needed by the individual producers. Applications for orders, however, are carefully scrutinized by the committee to guard against unnecessarily large production or the hoarding of materials by the manufacturers.

W. L. C.

Opposed to the Open Shop

Employees of the Pittsfield, Mass., plant of the General Electric Co. held a mass meeting March 25 and decided to ask the officers of the international unions to come to Pittsfield and endeavor to reach an agreement with the company that will prevent the establishment of an open-shop policy. This movement is due to the circulation of individual contracts among the employees, both organized and unorganized. The management is reported to have stated that the contract is intended to stabilize the working force, to guarantee steady work and that the signing of the contract is not compulsory. One of the clauses states that the management is willing to refer differences of opinion to an arbitration committee of three persons. The clause that has aroused the suspicion of the organized workmen reads:

"Both parties approve and desire strict and fair enforcement of the open-shop policy and agree that no employee shall be subjected to any discrimination, criticism, interference or annoyance on the ground that he is or is not a member of any labor union."

At the request of the Economy Board of the Council of National Defense the members of the National Implement and Vehicle Association, comprising the leading manufacturers of farm implements and machinery in the United States, have agreed to cut down the sizes and varieties of their products for the three-fold purpose of husbanding supplies of raw materials, utilizing manufacturing equipment to best advantage and reducing the amount of capital tied up in manufacturers' and dealers' stocks. The general rule covering the eliminations is very simple. Where two tools or machines of the same character are being made and will perform equally well the same operations, it is a war necessity that one of these be eliminated. The saving of manufacturing space and machine-tool equipment will enable many of the implement plants to undertake war work of various kinds without seriously interfering with production of farm equipment sufficient for the country's needs.

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Priorities for Stock Products

In discussing in our issue of March 21 the hardships which some manufacturers of iron and steel products suffer from priority decisions it was pointed out that the Government's war program may be seriously retarded unless stocks are kept up, which the Government or firms having Government contracts are constantly drawing upon in open-market purchases. It is often difficult for manufacturers of bolts, nuts, rivets, nails, screws, small tools and a great variety of shelf goods, including many foundry products, to show that a certain lot of steel or of pig iron which they are seeking to buy from a steel works or a blast furnace will be applied to Government work. From the time an order is placed until the material is delivered at a manufacturing plant, four to six months intervene; then there is a matter of weeks before the finished product can be turned out. It is evident that in deciding priorities, if heed is given only to the claims of companies having Government work or those having definite orders from Government contractors, the day will come when stock shortages will suddenly develop such as may hold up important war work.

So many inquiries have come to THE IRON AGE on this subject that we have brought it specially to the attention of the Priorities Committee. The result, as given in our Washington correspondence elsewhere in the article entitled "Priorities on Iron and Steel Products," will be of the greatest interest to the manufacturers affected. An insight is there given into the intricacies of the problems that are being dealt with, and the reader will not miss the painstaking attention that is being given to every aspect of the situation, both from the standpoint of the Government and the manufacture of goods for stock. The attitude of the committee is apparently defined as clearly as is possible in a general statement, and more specific answer may be expected in particular cases that will be brought up for rulings. The complications growing out of the number of Government agencies which must co-operate in these decisions can well be appreciated; but here time has brought some improvement, and fuel and railroad administrations should work with less friction as precedents multiply.

We commend particularly to the manufacturers interested in what our Washington correspondent says as to the importance of stating the situation with entire frankness. The committee has promised to consider carefully each case and to make such exceptions as seem called for to the general ruling concerning the maintenance or replacement of stocks.

A First Step

The announcement by the War Labor Conference of a comprehensive program for the settlement of disputes between labor and capital during the war is an event of tremendous importance, not only because the outlook is that all serious strikes during the period of the war will be prevented, but also because representatives of labor and capital, having been able to get together and agree upon a definite program for a period, may also be able to bring about permanently more cordial relations between employers and employees.

It was a matter of no small moment that five of the largest employers of labor in the country, of whom only one had been in the habit of dealing with trade unions, met the representatives of unions having a membership estimated at over 1,000,000 men and women. It was also highly significant that an ex-President of the United States was a member of the conference, and that Mr. Walsh, who had been noted for his extreme views and intemperate speech concerning employers, was able to agree with Mr. Taft and other representatives of the public and the employers. Of course, as Mr. Taft stated, the vital question is, "Will our plan work?" But it is not too much to hope with him and his associates that if administered in the spirit in which it was formulated and agreed upon this plan will prove to be the first move, and an important one, toward establishing better understandings between employers and those organizations of workmen that have been best known for their militancy.

The Airplane Disappointment

The reported failure to produce the expected number of Liberty aviation motors, which has been the subject of criticism in the United States Senate, is not due to lack of steel or machine-tool equipment, but largely to the delays always incident to

the development of a new machine of more or less intricacy. In peace times it would not be strange for an automobile company to spend several years in the perfection of a motor possessing none of the untried features of a high-power aviation motor.

Many strange things have happened in Washington in the conduct of war preparations, but none more inexplicable than the pinning of faith wholly to a new creation when success in the war hangs upon large and rapid production. The press-agent methods which were used to exploit the discovery of a motor which it was confidently declared would surpass any of the aviation motors used by our Allies aroused suspicions from the first among those familiar with the manufacturing difficulties which must be overcome before the Liberty motor could be called a success.

Months ago it became known that the airplane program was being delayed by changes in the design of the Liberty motor. Manufacturing plants which were created to build the motors stumbled into difficulty after difficulty, each having to be solved in its turn, with weeks of delay accompanying any change in plans. Several large plants have been equipped and are ready to turn out Liberty motors on a quantity basis, but aside from one factory in Detroit no manufacturer can point to a large production as yet.

When the United States entered the war there were two plants in the East, which after much experimenting had succeeded in turning out Gnome and Hispano-Suiza motors for the Allies. And the facilities of these two plants have not yet been realized to their full capacity. Our information leads us to believe that the aircraft situation is not nearly so bad as was pointed out in the Senate, but it is bad enough, considering what the United States planned to do. The fault is one that to an extent has extended to other Government departments. Each department shows a proneness to work out its own plans independently of other departments and without reference to the methods and practices of the Allies, and commonly bureaus and departments enter into competition with one another in purchases. In the matter of airplanes it seems obvious that production now is all important and not excessive straining for perfection of something which when finished is obsolete with respect to other component parts. The airplane is in a very rapid state of evolution, and while we are already following the practice to some extent we should make it the supreme effort to produce and design simultaneously.

Danger of Overconfidence

Overconfidence alone can prevent the third Liberty Loan from being even a greater success than the two preceding loans. The news from the great battlefield of France, beyond all question, has aroused the people to the importance of promptly raising the $3,000,000,000 which is now called for by the United States Government, and the raising of wages of tens of thousands of workmen in the iron and steel plants of the country, which has just been announced, will make it easier for these workers to take their full share of the new Liberty bonds.

These conditions are well known, and it behooves all who are enlisted in the cause of obtaining subscriptions not to be overconfident, but to go forward with determination to exert themselves to their utmost in obtaining not only subscriptions of good size, but in getting many subscriptions. The success of the loan being almost assured, it is highly important to get as large a percentage of men, women and children as possible in every community to add their names to the honor roll.

In THE IRON AGE for the past two weeks and to-day helpful suggestions are made as to methods of obtaining subscriptions. Very often what may seem to be an unimportant point proves to be almost vital in a campaign. Sometimes workers are alienated and even angered by indiscreet methods. An argument applied to one case will not fit another; but there is some way of reaching every one if he has a particle of patriotism in his soul.

Steel Corporation Output in 1917

The United States Steel Corporation's production and shipments make comparisons as follows with 1916, the figures referring to tons of the customary description:

	1917	Change
Iron ore mined	31,781,769	—1,573,400
Coal mined, except for coke	6,942,298	+ 779,958
Coke produced:		
Beehive	11,177,247	—1,301,913
By-product	6,284,428	— 138,374
Total	17,461,675	—1,440,287
Blast furnace output	15,652,928	—1,954,709
Bessemer ingots	6,405,390	— 868,376
Open-hearth ingots	13,879,671	+ 242,848
Total ingots	20,285,061	— 625,528
Steel products for sale	14,942,911	— 517,881
Domestic steel shipments	13,196,910	+ 121,615
Export steel shipments	2,173,195	— 293,598
Total steel shipments	15,370,105	— 171,983

The figures are noteworthy in a number of respects. The decrease in the production of beehive coke was, of course, in keeping with conditions well known during the year, there being an insufficient car supply to move coke, and its production necessarily hinged upon shipping facilities. That there should have been a decrease in the output of by-product coke was remarkable, in view of the special need of full operation of by-product plants on account of the war. While it may be somewhat venturesome to make the comparison, it may be observed that the production of coke was 71 per cent of the production of coal, stated to be for the manufacture of coke, and this gives a rough idea of the yield by a composite industry of beehive and by-product ovens.

The decrease in the production of coke was 7.6 per cent, while the decrease in blast-furnace output was fully 11 per cent, the divergence being suggestive of higher coke consumption per ton of pig iron as furnace operations became irregular through inadequate coke supply. This effect was probably much more noticeable in the case of detached furnace operations, where there was no alternative but to bank and run intermittently, while the Steel Corporation, with its large groups of furnaces, could conduct operations more systematically, keeping one furnace out and operating others in full.

The Institute pig-iron statistics, recently made public, show that the production of pig iron for the makers' own use decreased from 1916 to 1917

by 1,210,696 tons. This is not precisely the make of the steel companies which have blast furnaces of their own, but it is approximately so. As the Steel Corporation's decrease was 1,954,709 tons, the blast-furnace output of the independent steel interests appears to have increased in the neighborhood of 744,000 tons.

It is not surprising, in the matter of ingot output, that the Steel Corporation's Bessemer output should have decreased while the open-hearth output increased. Presumably that is a reflection of the pressure of Government orders, which run almost exclusively to open-hearth steel. A noticeable fact is that the Steel Corporation's total ingot output decreased 625,528 tons, while the output by independents evidently increased. The total output of ingots in 1916 was 41,401,917 tons, while the recent preliminary statistics of the Institute indicated that the 1917 output was about 42,200,000 tons. If so, the total must have increased by about 800,000 tons, which would mean an increase of 1,400,000 tons by the independents when the corporation output decreased 600,000 tons. This was a reflection, of course, of the corporation's shortage in pig iron and coke, as the management steadfastly refused to bid in the market for either coke or pig iron.

There was obviously a large consumption by the Steel Corporation of pig iron previously accumulated, which doubtless included the pig iron which is normally considered a great convenience to carry. If the same proportion between pig iron and ingots had obtained in 1917 as in 1916 there would have been more than 17,000,000 tons of pig iron, whereas there was only 15,650,000 tons, a divergence of 1,400,000 tons. What helped out somewhat was that there was a decrease in Bessemer ingot output, which means pig iron only, while there was an increase in open-hearth output, which means scrap in part. It may be, too, that there was an accumulation of pig iron in 1916. At any rate, several hundred thousand tons of pig-iron stocks were undoubtedly absorbed in 1917.

Another curious item is that while there was a decrease of 517,881 tons in the output of finished rolled-steel products there was a decrease of only 171,983 tons in the shipments of the same material. Thus the mill stocks were smaller at the close of 1917 than at the opening. The inadequacy of transportation facilities, which eventually crowded mill yards and warehouses, appears to have had its effect chiefly after the beginning of this year.

Conspicuous by their absence were any very marked changes in the character of the corporation's rolled-steel output. The dislocations that would naturally be expected by reason of the country's war steel demand made but little change in the distribution of the tonnage output among the different items. The most notable change, perhaps, was in the output of plates, which increased from 1,332,262 tons to 1,473,625 tons, or by 141,000 tons, nearly 11 per cent. The output of wire and wire products decreased 183,000 tons, or by about 9 per cent. It may be assumed for convenience that these two items balanced, having in mind that the total of all rolled products decreased a trifle, and that the changes in the various other items were not worthy of note. The output of both spelter and cement increased a trifle.

The Low-Phosphorus Iron Problem

The suggestion from the Government that steel foundries using low-phosphorus pig iron melt only irons containing copper, so that all the copper-free low-phosphorus metal may be used for gun forgings, opens up an interesting phase of steel foundry metallurgy. Copper has been a *bête noir* of acid open-hearth steel casting producers. They have assiduously tried to keep the percentage in their finished product as low as possible. Of the converter casting makers, two of the largest in the East testify that the presence of copper up to 0.75 to 1 per cent is a benefit rather than a harm. It remains to be seen what the effect will be in open-hearth practice if the Government program is carried out. Theoretically the presence of copper in acid open-hearth castings should show still better results than in the case of converter steel, because metallurgical conditions are such that a better steel is produced in the former case than in the latter. It is not now believed by many that copper in castings produces red shortness. In the converter the copper acts as an alloy, and it should be even more valuable in the open hearth in this respect.

The reason for the Government's suggestion referred to is the claim that copper in acid open-hearth forgings acts as a red shortener under forging conditions and hence produces an inferior product for large guns. If this is so, the diversion of all the non-copper low-phosphorus irons to gun forging plants is imperative, for the demand for such metal is growing larger with each month and the supply is already none too ample.

The suggestion has been made already that the electric furnace be called upon to help in making up the deficiency in low-phosphorus iron. Cost in such a case should not be too seriously considered; but it is claimed that with power under 1c. per kilowatt-hour, low-phosphorus iron can be made from steel scrap in small electric furnaces at a conversion cost of not to exceed $15 per ton. If this is so, final cost would be under the present Government price of $53 per ton. The quality of the iron made by this process is very high, especially adapting it for conversion into a superior metal for large gun forgings.

In view of the scarcity of low-phosphorus iron ores, especially those containing no copper, this suggestion is worth the careful consideration of the Government. While small electric furnaces up to five and six tons' capacity could make a fair daily output of high-grade pig iron, very low in phosphorus and sulphur, they could not make directly from steel scrap large enough ingots for big gun forgings. There is also to be considered the fact that in acid open-hearth practice only about 25 per cent of the charge is pig iron, and hence the low-phosphorus pig iron output of small electric furnaces would be utilized with high economy.

In this connection it is to be noted that the increase in Canada's output of pig iron in 1917 over that of 1916 was due entirely to low-phosphorus pig iron made from scrap in electric furnaces. The total is estimated to be over 15,000 tons. This has doubtless found its way into acid steel for large guns and is the only low-phosphorus iron made in Canada last year.

SCRAP COMMISSION REFUSED

Steel Institute Committee Takes Negative Action —Freight Differentials May Be Paid

The Committee on Steel and Steel Products of the American Iron and Steel Institute has decided not to grant to consumers of scrap the right to pay a commission to dealers and brokers who purchase old material for them. Final solution of this intricate question, which has kept the scrap trade in a turmoil for many weeks, will be put up to the War Industries Board, through action of the American Board of Scrap Dealers, whose secretary is C. A. Barnes, Pennsylvania Building, Philadelphia. The Institute committee took the attitude that to permit the payment of a commission would be in reality a violation of the fixed prices, as it would authorize consumers to pay above the Government maximum figures.

At the recent price conference in Washington this question was discussed and it was stated that dealers would not be averse to a reduction of more than $1 per ton on scrap if the commission could be allowed. Without the commission, they said, many dealers would be forced out of business.

The Director of Railroads is understood to have opposed the lowering of scrap prices more than $1 on the ground that to do so would reduce the revenue of the railroads from the sale of their old material, his position being that inasmuch as the Government has guaranteed dividends on railroad stocks all profits must be carefully safeguarded.

The real question at issue in the commission controversy is whether the dealer or broker is an essential factor in the iron and steel trade. If he is, the dealers claim, his services should be recognized. The appeal to be made to the consumers is designed to settle the question to the satisfaction of the War Industries Board, whether the dealer is practically indispensable to many iron and steel manufacturers.

May Pay Freight

A decision of importance has been reached by the Committee on Steel and Steel Products on the question of permitting certain consumers of scrap to pay, in addition to the maximum price of scrap, the freight differential between their plants and the nearest competitive buying point. The committee has agreed that consumers may pay such differentials when it is shown to the satisfaction of the Sub-Committee on Iron and Steel Scrap that it is necessary to do this to obtain sufficient supplies. Permits must be obtained from W. Vernon Phillips, chairman of the sub-committee, Pennsylvania Building, Philadelphia.

The effect of this decision will be this: The freight rate on heavy melting steel from New England to eastern Pennsylvania points is $2.90; from New England to Pittsburgh it is $3.60. Under the new arrangement Pittsburgh consumers will be permitted to pay the maximum price, plus the freight differential of 70 cents, for delivery at their plants. The same rule will apply to consumers of scrap at other points similarly affected. This will place Pittsburgh, the largest consuming district for scrap, on a parity with other markets in its buying.

All Scrap Included

In the recent price announcement by President Wilson it was stated that "scrap steel" would be reduced $1 per ton. This was assumed at first to mean only steel used in basic open-hearth furnaces, but an announcement of the Committee on Steel and Steel Products, dated March 28, says that this reduction applies to all grades of scrap. The announcement, which was made by Judge Gary, follows:

Referring to the statement authorized by the Council of National Defense, under date of March 26, that "The President today approved the recommendation of the Price Fixing Committee of the War Industries Board, that the maximum prices heretofore fixed by the President upon the recommendation of the Board, upon ore, coke, steel and steel products, subject to revision on April 1, 1918, be continued in effect until July 1, 1918; from April 1 to July 1, however, the maximum price of basic pig-iron be reduced from $33 to $32 per gross ton, and that the maximum price of scrap steel be reduced from $30 to $29 per gross ton"; it should be explained that it is the understanding of this committee that the reduction of $1 per gross ton is made on all prices of scrap, both base grades and differentials; the effect being to reduce by $1 per gross ton all prices shown in the differentials recommended by this committee under date of Feb. 21, 1918, and appearing on pages 14-A to 14-C, inclusive, of the list of maximum prices of iron and steel products, published by the American Iron and Steel Institute.

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PIG IRON IN MARCH

Sharp Increase Over February Output

A Gain of 21,000 Tons a Day—24 More Furnaces Active on April 1

Pig iron production showed a remarkable recovery in March, as has been indicated by the frequent additions to the list of active furnaces throughout the month. Telegraphed returns to THE IRON AGE from all but six furnaces out of a total of 344 (the six being estimated) show that the output in March was 3,213,091 gross tons against 2,319,399 tons in February. The daily average for the 31 days of March was thus 103,648 tons, against 82,835 tons in February. Thirty furnaces blew in last month and six blew out, making a net gain of 24. The estimated capacity of the 344 furnaces in blast April 1 was 106,500 tons a day, against 84,640 tons a day for the 320 furnaces active one month previous. Three new modern furnaces started to make pig iron in March—No. 8 furnace of the Lackawanna Steel Co., No. 1 furnace at Gary, Ind., and the fifth of the Iroquois group at South Chicago.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from February, 1917, is as follows:

Daily Rate of Pig-Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
March, 1917	73,731	31,132	104,863
April	79,031	32,134	111,165
May	77,561	32,677	110,238
June	76,805	32,197	109,002
July	76,440	31,380	107,820
August	71,436	33,336	104,772
September	73,290	31,175	104,465
October	76,664	29,886	106,550
November	77,135	29,724	106,859
December	66,605	26,392	92,997
January, 1918	55,662	22,137	77,799
February	56,938	25,897	82,835
March	74,526	29,122	103,648

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces in December and the three months preceding:

Monthly Pig-Iron Production—Gross Tons

	Dec. (31days)	Jan. (31days)	Feb. (28days)	Mar. (31days)
New York	175,999	168,467	153,184	186,908
New Jersey	19,495	18,296	15,616	16,103
Lehigh Valley	106,760	110,285	93,502	117,161
Schuylkill Valley	60,949	41,913	46,600	74,256
Lower Susquehanna and Lebanon Valley	69,228	49,089	38,094	69,691
Pittsburgh district	619,870	500,497	472,904	656,273
Shenango Valley	133,480	113,531	113,940	157,875
Western Pennsylvania	184,520	150,710	137,576	198,843
Maryland, Virginia and Kentucky	81,480	79,433	76,328	98,163
Wheeling district	86,621	82,752	61,547	112,106
Mahoning Valley	247,191	232,337	226,469	301,863
Central and Northern Ohio	230,575	204,527	188,423	265,710
Hock, Val., Hang. Rk. & S. W. Ohio	51,350	53,102	54,579	66,794
Chicago district	432,028	247,702	295,398	506,036
Mich., Minn., Mo., Wis. Col. and Wash.	113,350	112,225	106,660	122,323
Alabama	237,227	219,167	209,586	228,988
Tennessee and Ga.	32,795	27,735	28,993	33,998
Total	2,882,918	2,411,768	2,319,399	3,213,091

Among furnaces blown in in March or on April 1 were one Lackawanna (new) and Genesee (April 1) in New York, one Wharton in New Jersey, one Saucon in the Lehigh Valley, one Swede and Keystone in the Schuylkill Valley, one Bird Coleman and one Colebrook in the Lebanon Valley, one Carrie, one Edgar Thomson, one Aliquippa and one Eliza in the Pittsburgh district, one Farrell and one Shenango in the Shenango Valley, one Cambria and Scottdale in Western Pennsylvania, one Bellaire and Mingo in the Wheeling district, McKeefrey and one Youngstown in the Mahoning Valley, one South Chicago, one Iroquois (new) in Illinois, and two Gary (one new) in Indiana.

The list of furnaces blown out last month includes, Crumwold in Lehigh Valley, Paxton in Lower Susquehanna Valley, North Cornwall in Lebanon Valley, Isabella in Pittsburgh, and one Bessemer in Alabama.

Capacity in Blast

The following table shows the number of furnaces in blast April 1 in the different districts also the number and daily capacity in gross tons of furnaces in blast March 1. Estimates of capacity in blast by districts at the beginning of the new production month are omitted:

Coke and Anthracite Furnaces in Blast

Location of furnaces	Total number of stacks	Apr. 1 Number in blast	Apr. 1 Capacity per day	Mar. 1 Number in blast	Mar. 1 Capacity per day
New York:					
Buffalo	19	17	.....	17	5,353
Ferro	1	1	.....	0	0
Other N. Y.	4	3	.....	2	219
New Jersey	4	3	.....	4	536
Ferro	1	1	.....	0	.....
Pennsylvania:					
Lehigh Valley	21	12	.....	12	3,232
Spiegel	2	2	.....	2	176
Schuylkill Val.	12	10	.....	8	2,017
Spiegel	1	1	.....	1	50
Lower Susquehanna	8	5	.....	7	1,411
Spiegel	2	2	.....	1	90
Lebanon Val.	8	3	.....	4	203
Ferro and Spiegel	3	3	.....	1	30
Pittsburgh Dist.	53	46	.....	43	16,471
Ferro and Spiegel	4	2	.....	2	304
Shenango Val.	19	17	.....	15	4,401
Western Pa.	25	22	.....	20	4,856
Ferro and Spiegel	3	2	.....	1	34
Maryland	4	3	.....	3	891
Wheeling dist.	14	11	.....	9	2,555
Ohio:					
Mahoning Val.	26	24	.....	22	8,103
Central and Northern	26	23	.....	21	7,173
Hock. Val., H'g R'k & S. W. Ohio	17	15	.....	15	1,967
Illinois and Ind.	40	37	.....	31	10,515
Ferro	2	1	.....	2	....
Michigan, Wis. & Minnesota	12	9	.....	9	2,074
Colorado, Mo. & Washington	7	5	.....	6	1,414
Ferro	1	1	.....	0	....
The South:					
Virginia	16	14	.....	14	1,336
Ferro	3	2	.....	1	25
Kentucky	7	5	.....	4	600
Alabama	37	30	.....	32	7,485
Ferro	1	1	.....	0	....
Tenn. & Ga.	16	11	.....	11	1,017
Total	419	344	*106,500	320	84,640

*Estimated.

Production of Steel Companies

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies show the following totals of steel-making iron month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total production 1916	1917	1918	Spiegeleisen and ferromanganese 1916	1917	1918
Jan.	2,251,035	2,244,203	1,725,513	24,866	38,792	30,695
Feb.	2,183,845	1,829,846	1,594,140	23,877	32,137	26,114
Mar.	2,365,116	2,285,430	2,310,297	29,388	36,563	39,122
Apr.	2,316,768	2,370,937	.....	31,862	39,595	.....
May	2,408,890	2,404,380	.....	35,844	37,701	.....
June	2,295,784	2,304,155	.....	38,597	30,829	.....
July	2,306,303	2,369,630	.....	31,353	43,884	.....
Aug.	2,313,122	2,214,513	.....	33,338	39,492	.....
Sept.	2,309,710	2,198,705	.....	29,451	42,235	.....
Oct.	2,530,806	2,376,589	.....	34,566	48,691	.....
Nov.	2,404,210	2,314,857	.....	44,975	34,688	.....
Dec.	2,294,620	2,064,757	.....	43,470	29,902	.....

The Record of Production

Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1913—Gross Tons

	1914	1915	1916	1917	1918
Jan.	1,885,054	1,601,421	3,185,121	3,150,938	2,411,768
Feb.	1,888,670	1,674,771	3,087,212	2,645,247	2,319,399
Mar.	2,347,867	2,063,834	3,337,691	3,251,352	3,213,091
Apr.	2,269,655	2,116,494	3,227,768	3,334,960	.....
May	2,092,686	2,263,470	3,361,073	3,417,340	.....
June	1,917,783	2,380,827	3,211,588	3,270,055	.....
July	1,957,645	2,563,420	3,224,513	3,342,438	.....
Aug.	1,995,261	2,779,647	3,203,713	3,247,947	.....
Sept.	1,882,577	2,852,561	3,202,366	3,133,954	.....
Oct.	1,778,186	3,125,491	3,508,849	3,303,038	.....
Nov.	1,518,316	3,037,308	3,311,811	3,205,794	.....
Dec.	1,515,752	3,203,322	3,178,651	2,882,918	.....
Total yr.*	23,049,752	29,662,566	39,039,356	38,185,981	.....

*These totals do not include charcoal pig iron. The 1917 production of this iron was 376,525 tons.

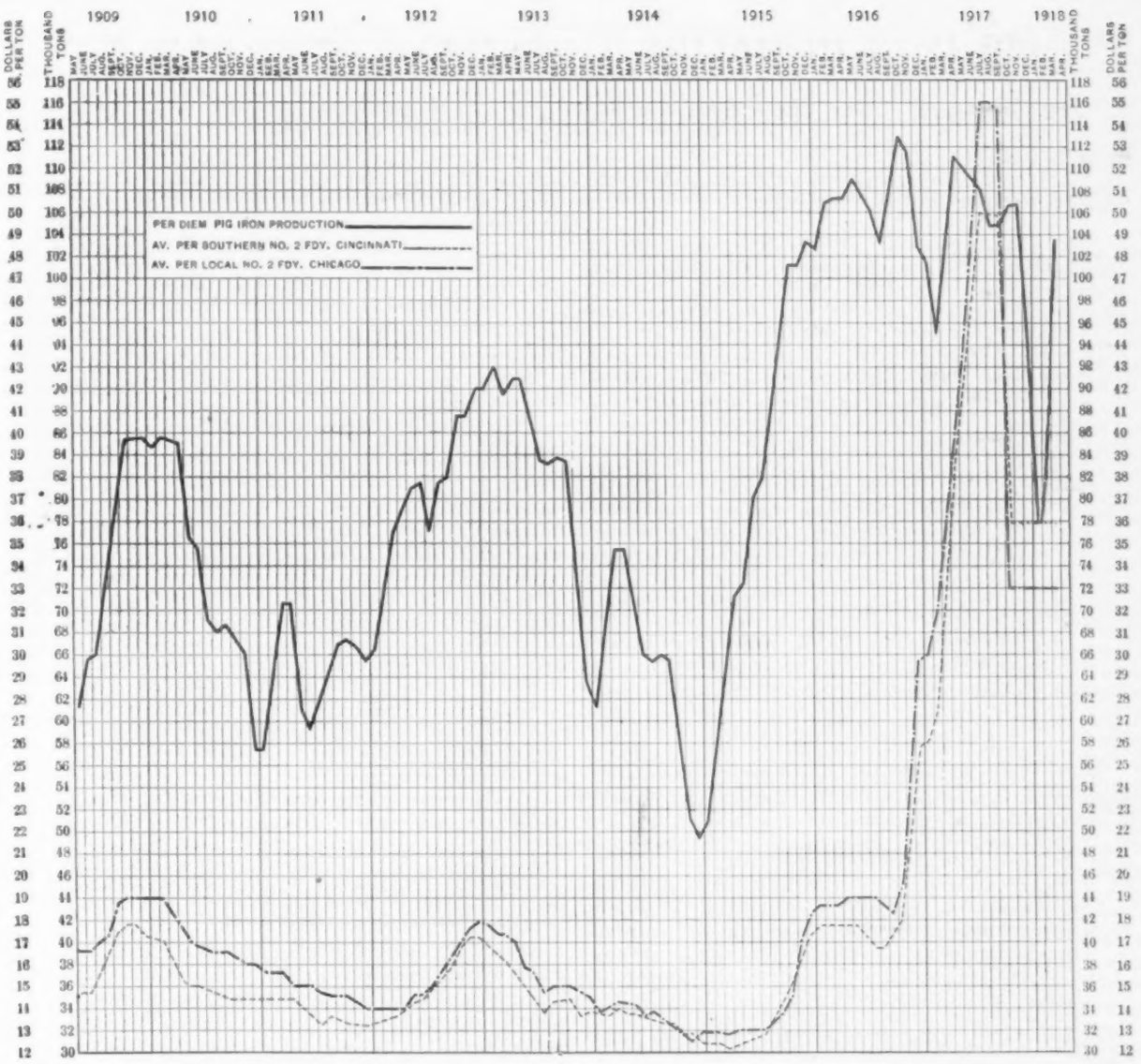

Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from May 1, 1909, to April 1, 1918; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace

The figures for daily average production, beginning January, 1911, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1911—Gross Tons

	1911	1912	1913	1914	1915	1916	1917	1918
Jan.	56,752	66,384	90,172	60,808	51,659	102,746	101,643	77,799
Feb.	64,090	72,442	92,369	67,453	59,813	106,456	94,473	82,835
Mar.	70,036	77,591	89,147	75,738	66,575	107,667	104,882	103,648
Apr.	68,836	79,181	91,759	75,665	70,550	107,592	111,165	.....
May	61,079	81,051	91,039	67,506	73,015	108,422	110,238	.....
June	59,585	81,358	87,619	63,916	79,361	107,053	109,002	.....
July	57,841	77,738	82,601	63,150	82,691	104,017	107,820	.....
Aug.	62,150	81,046	82,057	64,363	89,666	103,346	104,772	.....
Sept.	65,903	82,128	83,531	62,753	95,085	106,745	104,465	.....
Oct.	67,811	86,722	82,133	57,361	100,822	113,189	106,550	.....
Nov.	66,648	87,697	74,453	50,611	101,244	110,394	106,859	.....
Dec.	65,912	89,766	63,987	48,896	103,333	102,537	92,997	.....

Diagram of Pig-Iron Production and Prices

The fluctuations in pig-iron production from May, 1909, to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of daily average production by months of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of a local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of THE IRON AGE.

It is reported that South Australia has an iron deposit containing millions of tons of ore. The property is about 3 miles from a railroad station and about 20 miles from Port Adelaide. A qualified expert has certified that there are 3,000,000 tons of iron ore, which can be mined immediately for about 24c. per ton into cars, that it is possible to take the ore out easily with a shovel and that there are no engineering difficulties. An analysis of three samples gives percentages of iron respectively of 66.58, 67.31 and 66.29.

New Virginia Manganese Ore Property

The Mineral Ridge Manganese Corp., Strasburg, Va., recently chartered with a capital of $250,000 has acquired the property of the North Georgia Land & Mineral Co. in Frederick County, Va., as well as some 400 acres of adjoining mineral rights, making in all about 700 acres. The North Georgia Land & Mineral Co. acquired the property a number of months ago and has been engaged mainly in building and installing mining equipment, pump and pipe lines, a washer and other equipment, but it has incidentally mined and shipped some 200 tons of high grade ore averaging 47 to 49 per cent manganese, 1 to 1.50 per cent iron and 3.5 to 4.5 per cent silica. The new corporation will take possession of the properties in a few days and the ore treating equipment was to be completed about April 1, at which time the company expected to begin shipping washed ore at the rate of at least one car per day, with the further expectation of materially increasing the output in the near future. The officers are: President, W. B. Shaffer, Nazareth, Pa.; vice-president and general manager, M. W. Shaffer, Star Tannery, Va.; secretary and treasurer, Charles F. Nelson, Strasburg, Va.

Iron and Steel Markets

GREAT PIG-IRON INCREASE

March Rate Nearly Up to That of 1917

Pressure for Ship Plates—Government Wants Dominate the Trade

A remarkable recovery in pig-iron production is shown by the statistics for March gathered by wire from 344 blast furnaces. The total was 3,213,091 tons, or 103,648 tons a day, as against 2,319,399 tons in the 28 days of February, or 82,835 tons a day. As coke supply has increased, more furnaces have wheeled into line, the net gain in the month being 24. The 344 coke iron furnaces in blast April 1 were producing at the rate of about 106,500 tons a day, as compared with an actual average production of coke iron in the year 1917 of 105,000 tons a day.

Three new modern blast furnaces were put in operation last month, one by the Lackawanna Steel Co. at Buffalo, one by the Steel Corporation at Gary, Ind., and one by the Iroquois Furnace Co. at South Chicago. These additions emphasize the tendency to give the larger furnaces a full supply of coke, while that of smaller stacks is more or less irregular. Further indication of the same policy is the fact that the steel companies' rate of pig-iron output in March was 30 per cent greater than in February, while that of merchant furnaces was only 12 per cent greater.

The fact that pig-iron production has increased so quickly in the favorable weather of March points to a relaxing of famine conditions in that market sooner than has been thought possible.

Government wants figure so largely that ordinary consumption has become quite incidental. The pending award of 100,000 cars, of which about half will be box cars, is the immediate market feature. A total of 1,000,000 tons of plates and 250,000 tons of shapes is now the estimate on these orders, but deliveries will be distributed over many weeks.

The designing of standard freight cars means that a good many patented car specialties will be omitted and the makers are not a little disturbed.

There is greater pressure from Washington for ship plates, which could have been produced fast enough to meet all needs had not plate mills been compelled to close in January and February while fuel went to non-essential industries. Now plate mills are notified that at least 75 per cent of their output must go to Government work. As to the remaining 25 per cent full details must go to Washington as to shipments and consignees. The long-delayed settlement with Japan involves the shipment to that country of 100,000 tons of steel, mostly plates. Some of this tonnage is already in storage on the Pacific Coast, but the long-standing Government embargo wiped off the books many Japanese contracts at 9c. and 10c. for ship steel.

It is understood that the Government rail requirements will add 300,000 tons, or more than 10 per cent, to the total which the railroads had already put on the books of the mills for delivery this year.

The sheet trade is still awaiting the distribution of 50,000 tons of No. 24 corrugated sheets for hangars in France and for the small steel buildings of which many will be used in the restoration of French villages.

The new requirements section of the War Industries Board seems likely to become a co-ordinating factor of first importance, eliminating by means of priorities the present competition in purchases among Government departments. It still happens that a mill gets a peremptory order to ship in a few weeks a kind of product on which A-1 orders are already booked for as many months of the plant's capacity. Independently of this, Government announcement has been made that fabricators are not to consider private building projects having no war connection or public buildings other than those for the Federal Government, the broad intimation being added that under priority rulings the steel would not be forthcoming.

Quite a portion of the shell discard steel accumulating from time to time is rolled into 20 to 40-lb. rails for sale at the regular light rail price. The composition as to carbon and manganese is regarded as particularly satisfactory. Lots of 500 and 1000 tons have been sold to Japan.

The old material trade has failed to carry its point with the general committee of steel manufacturers, the latter having refused to allow consumers to pay a commission of 3½ per cent to dealers. An adjustment has been made, however, under which consumers may pay a freight differential in some cases. Thus Pittsburgh buyers may secure melting steel scrap from New England by paying the 70-cent difference between the freight to Pittsburgh and the freight to eastern Pennsylvania.

Express shipments of tonnage products are still noted, not merely to meet urgent demands, but to secure transportation which freight embargoes prohibit. In some cases railroad preference given to less than carload lots have resulted in shipping full carloads as made of two or three part loads and of course at the higher freight rates.

Pittsburgh

PITTSBURGH, April 2 (*By Wire*).

General conditions in the steel trade are very quiet, and the amount of buying is very light. There is no incentive for consumers to place orders ahead, nor for the producers to try to obtain orders for future delivery, as prices recently reaffirmed expire by limitation on June 30, and very few makers of iron or steel products have any material to sell for delivery before the third quarter. There is a scarcity in pig iron of all kinds, with practically no free iron on the market. Almost nothing is being done in billets or sheet bars, the condition in these as regards supply being the same as in pig iron. In finished steel products, probably 75 per cent or more of the new business being placed is coming from the Government on direct or indirect orders. Some rather heavy orders for sheets have lately been placed by the Government, and one or two very large contracts are pending. A scarcity in ferromanganese

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Apr. 3 1918	Mar. 27 1918	Mar. 6 1918	Apr. 4 1917
No. 2 X, Philadelphia	$34.25	$34.25	$34.25	$40.00
No. 2, Valley furnace	33.00	33.00	33.00	38.00
No. 2 Southern, Cin'ti.	35.90	35.90	35.90	35.90
No. 2, Birmingham, Ala.	33.00	33.00	33.00	33.00
No. 2, furnace, Chicago*	33.00	33.00	33.00	38.00
Basic, deliv., eastern Pa.	*32.75*	33.75	33.75	36.00
Basic, Valley furnace	*32.60*	33.00	33.00	35.00
Bessemer, Pittsburgh	*36.15*	37.25	37.25	39.95
Malleable, Chicago*	33.50	33.50	33.50	38.00
Malleable, Valley	33.50	33.50	33.50	37.00
Gray forge, Pittsburgh	32.75	32.75	32.75	35.95
L. S. charcoal, Chicago	37.50	37.50	37.50	38.75
Billets, etc. Per Gross Ton:				
Bess. rails, heavy, at mill	55.00	55.00	55.00	38.00
O.-h. rails, heavy, at mill	57.00	57.00	57.00	40.00
Bess. billets, Pittsburgh	47.50	47.50	47.50	70.00
O.-h. billets, Pittsburgh	47.50	47.50	47.50	70.00
O.-h. sheet bars, P'gh	51.00	51.00	51.00	72.50
Forging billets, base, P'gh	60.00	60.00	60.00	90.00
O.-h. billets, Philadelphia	50.50	50.50	50.50	70.00
Wire rods, Pittsburgh	57.00	57.00	57.00	85.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents.	Cents	Cents
Iron bars, Philadelphia	3.685	3.685	3.685	3.659
Iron bars, Pittsburgh	3.50	3.50	3.50	3.50
Iron bars, Chicago	3.50	3.50	3.50	3.25
Steel bars, Pittsburgh	2.90	2.90	2.90	3.75
Steel bars, New York	3.095	3.095	3.095	3.919
Tank plates, Pittsburgh	3.25	3.25	3.25	5.75
Tank plates, New York	3.445	3.445	3.445	5.919
Beams, etc., Pittsburgh	3.00	3.00	3.00	3.75
Beams, etc., New York	3.195	3.195	3.195	3.919
Skelp, grooved steel, P'gh	2.90	2.90	2.90	4.75
Skelp, sheared steel, P'gh	3.25	3.25	3.25	5.00
Steel hoops, Pittsburgh	3.50	3.50	3.50	4.25

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire,	Apr. 3 1918	Mar. 27 1918	Mar. 6 1918	Apr. 4 1917
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	5.00	5.00	5.00	5.50
Sheets, galv., No. 28, P'gh	6.25	6.25	6.25	7.25
Wire nails, Pittsburgh	3.50	3.50	3.50	3.20
Cut nails, Pittsburgh	4.00	4.00	4.00	3.75
Fence wire, base, P'gh	3.25	3.25	3.25	3.15
Barb wire, galv., P'gh	4.35	4.35	4.35	4.05
Old Material: Per Gross Ton:				
Carwheels, Chicago	*$29.00*	$30.00	$30.00	$22.50
Carwheels, Philadelphia	*29.00*	30.00	30.00	25.00
Heavy steel scrap, P'gh	*28.50*	30.00	30.00	27.00
Heavy steel scrap, Phila.	*28.00*	29.00	30.00	24.50
Heavy steel scrap, Ch'go.	*29.00*	29.50	29.50	26.00
No. 1 cast, Pittsburgh	*29.00*	30.00	30.00	23.00
No. 1 cast, Philadelphia	*29.00*	30.00	30.00	25.00
No. 1 cast, Ch'go, net ton.	27.50	27.50	26.75	19.25
No. 1 RR. wrot., Phila	*34.00*	35.00	35.00	34.00
No. 1 RR. wrot., Ch'go, net	*30.36*	30.75	30.75	29.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$6.00	$6.00	$6.00	$7.50
Furnace coke, future	6.00	6.00	6.00	7.00
Foundry coke, prompt	7.00	7.00	7.00	9.50
Foundry coke, future	7.00	7.00	7.00	7.50
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake, copper, New York	23.50	23.50	23.50	34.00
Electrolytic copper, N. Y.	23.50	23.50	23.50	34.00
Spelter, St. Louis	*7.00*	7.25	7.625	10.50
Spelter, New York	*7.25*	7.50	7.875	10.75
Lead, St. Louis	*7.00*	7.10	7.10	9.15
Lead, New York	*7.20*	7.25	7.25	9.35
Tin, New York	85.00	85.00	85.00	54.25
Antimony (Asiatic), N. Y.	*13.00*	13.25	13.50	36.00
Tin plate, 100-lb. box, P'gh	$7.75	$7.75	$7.75	$8.00

has developed, which may become serious. Consumers are hastening to cover, and sales of considerable size have been made. The railroad situation is steadily getting better and this is reflected in the March output of pig iron, which showed a very heavy increase over February. There is still a shortage in supply of box cars, and this is holding up mill shipments. Very heavy stocks of all kinds of finished steel products are still piled in mill warehouses, but these are gradually being reduced as the supply of cars improves. Local steel mills are pretty well filled up with business on all lines over the next six to eight months and longer, and all indications point to a normal rate of operation among the steel plants providing pig iron can be obtained and enough cars to ship the mill products.

Pig Iron.—Practically no pig iron is selling in this market, but there is an insistent demand, with none to be had. All the steel companies and other users of pig iron would be very glad to buy if they could find the iron. Merchant Valley furnaces are practically sold up for the remainder of this year, and consumers are urging shipments, showing that the iron is being melted as fast as received. The rate of operation among blast furnaces in the Pittsburgh, Youngstown and Wheeling districts is very much better. On April 1, the Carnegie Steel Co., had 46 furnaces in blast, and only 13 idle, the best operation record this company has had in a long time. Out of 11 stacks, the Jones & Laughlin Steel Co., is operating 10, its No. 3 Aliquippa furnace being out of blast for relining. The National Tube Co. is also operating 10 out of 11 stacks, having only one Lorain stack idle. The Youngstown Sheet & Tube Co. is operating its four East Youngstown furnaces, and one Hubbard furnace, the other being out for repairs. The Republic Iron & Steel Co. has all its Valley furnaces going except one, which is being relined. The output of pig iron in March in the Pittsburgh, Youngstown and Wheeling district will show an increase of perhaps 40 per cent over February. Effective April 1, the price of basic iron was fixed by the War Industries Board at $82, and standard Bessemer at $35.20 at Valley furnace, prices on other grades of iron remaining the same as in the first quarter.

We quote as follows: Basic pig iron, $32; Bessemer, $35.20; gray forge, $32; No. 2 foundry, $33; No. 3 foundry, $32.50, and malleable, $33.50, all per gross ton at Valley furnace, the freight rate for delivery in the Cleveland and Pittsburgh districts being 95c. per ton.

Billets and Sheet Bars.—We do not hear of any sales. None of the mills has steel to spare, and all are more or less behind in shipments on contracts with regular customers. There is an acute shortage in the supply of basic steel, and wherever possible, Bessemer steel is being substituted. One Youngstown, Ohio, steel plant is shipping nearly 100 per cent of its output of open-hearth steel on Government orders, and two other Youngstown plants about 75 per cent. These companies are supplying Bessemer sheet bars to customers to whom they formerly sold open-hearth. There is some inquiry for forging billets, and three or four small sales have been made for prompt shipment at considerably above the $60 Government price.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $47.50, sheet bars $51, forging ingots $73, and forging billets $60 base, all f.o.b. at mill, Pittsburgh or Youngstown.

Ferroalloys.—An acute shortage in supply of 80 per cent ferromanganese has developed in this district, consumers being somewhat alarmed over the situation, and are actively trying to cover themselves as far as possible over the remainder of this year. Several producers of 70 per cent ferromanganese are now quoting $250, Pittsburgh, for it, and it is said some sales of 70 per cent have been made at that price. Consumers are willing to pay that figure for 70 per cent rather than run the risk of not having a supply. One local steel company is said to have bought 3000 tons of 80 per cent ferromanganese for delivery over last half of this year, and another consumers has bought 1000 to 1500 tons for the same delivery at the same price. It is understood this ferromanganese is coming from a producer in the Chicago district. Several dealers in 80 per cent are quoting as high as $275 for it, but as yet

we do not hear of any sales at that figure. We now quote 70 and 80 per cent domestic ferromanganese at $250 to $275, delivered, 50 per cent ferrosilicon at $175 and $180, furnace, the furnace usually paying the freight to point of delivery, and we quote 18 to 20 per cent spiegeleisen at $65 to $70, furnace.

We now quote 9 per cent Bessemer ferrosilicon at $54, 10 per cent $55, 11 per cent $58.30, 12 per cent $61.60. We quote 6 per cent silvery iron $40, 7 per cent $42, 8 per cent $44.50, 9 per cent $47, 10 per cent $50. Three dollars per gross ton advance for each 1 per cent silicon for 11 per cent and over. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, these furnaces having a uniform freight rate of $2 per gross ton, for delivery in the Pittsburgh district.

Steel Rails.—We note continued active demand for light rails from the coal-mining and lumber interests, particularly from the latter, and the mills that roll light rails are sold up for some months. Obligations on the books of the Carnegie Steel Co. will take its entire output of standard sections and light rails through probably the first half of next year. The Government price of $3 per 100 lb. for 25-lb. to 45-lb. sections has been reaffirmed for second quarter.

Structural Material.—No new work is coming out in this district, and local fabricators say there is very little inquiry from anywhere for general work. The Government is still placing heavy orders for structural steel work, on which local fabricators are working largely, but no details of these contracts are given out. The American Bridge Co. and the McClintic-Marshall Co. are well filled up over the remainder of this year. We quote beams and channels up to 15-in. at 3c., Pittsburgh.

Tin Plate.—Some Government inquiry for tin plate has come out in the past week, but nothing very large. It is said that stocks of tin plate piled in warehouses of the mills by reason of the extreme cold and car shortage in January and February were reduced more than 800,000 boxes, and that there are still about 1,200,000 boxes or more piled in mill warehouses waiting cars for shipment. Tin plate operation is averaging very close to 95 per cent of normal capacity. Practically all of the tin plate to be made this year is under contract, but the shortage in supply of box cars is holding up shipments considerably, especially in the Pittsburgh and Wheeling districts. The demand for stock items of tin plate is active, and these are moving out very freely. An inquiry is in the market from Japan for 150,000 base boxes of tin plate, but local makers say their obligations are so heavy they do not care to make a price on it. In addition it is doubtful whether a Government permit could be secured by the intending purchaser for such a large quantity of tin plate to be shipped out of this country, where the plate is so badly needed. We quote tin plate at $7.75 per base box rolled from Bessemer or open-hearth steel. Prices on terne plate are given on page 907.

Plates.—As yet nothing has been heard here of the reported Government order for 50,000 cars, and local car builders have no definite advices as to when the expected order may come out. Inquiry for industrial steel cars is very light. The Pressed Steel Car Co. has taken 50 60-ton steel hoppers for the Chile Exploration Co., to be shipped to Chile, and 50 12,000-gal. steel tank cars for the Canadian Pacific Railroad. There is evidence that some of the smaller plate mills that do not have much Government business will likely be badly in need of orders before very long. The larger makers of plates, such as Carnegie Steel Co., Jones & Laughlin Steel Co., Republic Iron & Steel Co., and others, have heavy Government orders for plates that will take their output largely over the remainder of this year. We quote ¼-in. and heavier sheared plates at 3.25c. at mill.

Sheets.—The regular monthly meeting of the National Association of Sheet and Tin Plate Manufacturers is being held in the William Penn Hotel in this city to-day (Tuesday) and about 40 representatives of sheet and tin mills are present. It is not believed any action of vital interest to the trade will be taken. The Government is still placing heavy orders for smooth black and painted corrugated sheets, these orders being distributed among the mills every day or two. It develops that the Government order for 50,000 tons or more of No. 24 gage painted corrugated sheets to be used in building hangars and small steel buildings in France has not yet been placed. It is said a very large quantity of corrugated sheets will be used by the Government in replacing small buildings in villages in France that have been practically wiped out by the war. At first the scheme was tried of erecting temporary wooden buildings, but this has been abandoned to a large extent and corrugated steel sheets will be used largely in the future in erecting these small buildings. Sheet mills are well sold up on all grades to July, and some mills largely through third quarter. Prices are very firm, and it is said no sheets are being sold at less than the Government maximum prices, and these are given in detail on page 907.

Iron and Steel Bars.—Mills report active demand for both iron and steel bars, and specifications against contracts are active. New business is particularly heavy in soft steel bars, and the demand for concrete reinforcing bars is also reported to be somewhat better. A considerable part of the output of the mills in iron and steel bars is going to the Government on direct and indirect orders. Government maximum prices for second quarter are as follows: Steel bars rolled from steel billets, 2.90c.; from old steel rails, 3c., and refined iron bars, 3.50c. in carloads, f.o.b. Pittsburgh.

Wire Rods.—The inquiry is only fairly active, the falling off in demand being occasioned by the quiet condition ruling in wire and wire nails. There is some inquiry for high-carbon rods, and we note a sale of 300 tons of 60 to 70 carbon rods at $78, Pittsburgh. Prices in effect on rods for second quarter are given in detail on page 907.

Wire Products.—The Government has placed with three or four mills the 30,000 kegs of wire nails wanted by the Army through the General Engineer Department for shipment to France. It is said the order was about equally divided among the participating mills and that the price was $3.50 base, f.o.b. Pittsburgh, delivery to be over the next three or four months. The current demand for wire and wire nails from the general trade is only fair, but local makers of wire and wire nails say they are well filled up over the next three or four months, and so far they have not found it necessary to make any reductions in prices to secure new business. Prices on wire and wire nails, as reaffirmed by the War Industries Board and in effect for second quarter are given in detail on page 907.

Hot-Rolled Strip Steel.—The demand from the general trade is quiet, and mills making hot-rolled strip steel are not operating to more than about 50 per cent of capacity, due to lack of orders, and also shortage in supply of steel. The Government maximum price on hot-rolled strip steel is $4.50 per 100 lb., f.o.b. Pittsburgh, for second quarter, but it is said sales have been made recently at considerably less than this figure.

Cold-Rolled Strip Steel.—The new demand from the general trade is quiet, and inquiry from the Government has fallen off a good deal lately. Mills making cold-rolled strip steel are operating only to about 50 per cent of capacity, on account of shortage in steel and also in supply of cars, which are holding up shipment. Considerable quantities of cold-rolled strip steel are still piled in mill warehouses.

We quote cold-rolled strip steel at $6.50 per 100 lb., f.o.b. Pittsburgh, terms 30 days, less 2 per cent cash in 10 days, when sold in quantities of 300 lb. or more.

Nuts and Bolts.—Makers of nuts and bolts are in need of orders, and in some cases are shading prices from 5 to 7½ per cent, depending upon the desirability of the order. The Government is negotiating at present for a large purchase of nuts and bolts. The details are now being arranged, and will likely be fixed up in the

near future. Government discounts on nuts and bolts reaffirmed for second quarter, but being more or less shaded, are given on page 907.

Rivets.—The general demand is quiet, and has been for some months. The Government is placing fairly heavy orders for rivets, but all the makers could readily handle more business, if they had it, and prices are none too firm. Government prices reaffirmed for second quarter are $4.75 for conehead boiler rivets, and $4.65 for structural rivets, per 100 lb., f.o.b. Pittsburgh.

Spikes.—The demand for railroad spikes is very dull, but for small spikes is active and on these makers are sold up over the next three or four months. Prices on spikes for second quarter as reaffirmed by the War Industries Board are as follows:

Standard sizes of railroad spikes, 9/16 x 4½ in. and larger, $3.90 per 100 lb. in lots of 200 kegs of 200 lb. each, or in larger lots. Boat spikes, $5.25 per 100 lb.; track bolts, $4.90 base in lots of 200 kegs or more; less than 200 keg lots, $1 per 100 lb. extra. All f.o.b. Pittsburgh.

Shafting.—Makers report the demand slightly better. Some delayed business from automobile builders on which shipments were held up is now being specified for, and shipments are going forward. The Government is still taking probably 75 per cent of the output of shafting, which at present is not more than 50 to 60 per cent of normal capacity. Large stocks are still piled in mill warehouses waiting cars for shipment. We quote cold-rolled shafting at 17 per cent off list in carloads, and 12 per cent in less than carloads, f.o.b. Pittsburgh.

Wrought Pipe.—Output of iron and steel pipe by the mills in March showed an increase of 30 to 40 per cent, and in the case of one large mill close to 50 per cent over February. Mills rolling iron and steel pipe are sold up for months, and are turning away every little while large projects involving iron and steel line pipe, which they say they could not possibly handle. Former discounts on iron and steel pipe, as reaffirmed by the War Industries Board, and in effect for second quarter are given on page 907.

Boiler Tubes.—Mills rolling iron and steel tubes are sold up for all of this year, and several of the larger makers through the first half of 1918. Discounts on iron and steel tubes, as reaffirmed recently, are given on page 907.

Skelp.—This is the scarcest article on the whole list of steel products. Mills rolling iron and steel skelp are sold up for a considerable time, and are turning away business nearly every day on which they are unable to make the delivery wanted. Prices are very firm, and it is said premiums would be paid by some consumers of skelp over the regular Government prices if such a course were permitted. One leading maker of steel skelp reports that its present obligations will take its entire output over all of this year.

We quote grooved skelp at $2.90; universal skelp, $3.15, and sheared skelp, $3.25 base. Special skelp for boiler tubes, etc., is $3.40 for base sizes and $3.55 for other sizes, all prices being per 100 lb., f.o.b. Pittsburgh.

Coke.—Transportation conditions in the coke trade are steadily getting better, the average supply of cars last week having been from 65 to 70 per cent, the largest in any one week for four or five months. Reports from blast furnace companies in the Pittsburgh, Youngstown, Wheeling and other pig iron making districts indicate strongly that the supply of coke is nearly up to normal. With continued good weather, such as prevailed in nearly all of March, it is expected that the supply of cars for coke shipments by May 1, or earlier, will be nearly back to normal. The output of coke is steadily increasing, but as yet not much free coke is being made, all the coke turned out being shipped to consumers as fast as cars can be obtained. No changes in prices of coke were made by the War Industries Board, and the same prices will rule in second quarter as in first quarter. These prices are $6 for 48-hr. blast furnace coke, $7 for 72-hr. foundry coke, and $7.30 for crushed coke, from 1 in. size, all in net tons at oven. The Connellsville *Courier* gives the output of coke in the upper and lower Connellsville regions for the week ending March 23, as 339,580 tons, an increase over the previous week of 4458 tons, or a gain in output over several months ago of close to 100,000 tons per week.

Old Material.—Leading scrap dealers in various scrap centers are now actively at work gathering information from the larger consumers who are favorable to paying a commission of 3½ per cent to dealers on scrap they may purchase for them, and this information will be presented in due time to the War Industries Board at Washington in the belief that that body will make a ruling allowing consumers to pay a commission of 3½ per cent on any purchases of scrap they make from responsible dealers. It is said that consumers in all centers are willing to pay this commission, and in fact desire to pay it, as they feel by doing so, they will be able to get scrap more promptly, and with less expense than if they started out to buy it here and there on their own responsibility. Strong evidence will be produced from scrap consumers that they are willing and anxious to pay this commission, and this is expected to have considerable influence in inducing the War Industries Board to allow the commission to be paid. The reduction of $1 per ton on what was termed "steel making scrap," applies to all grades of scrap, and not exclusively to heavy steel melting scrap, as the ruling of the War Industries Board was first interpreted. Dealers in old material are not trying to do business under the present unsatisfactory conditions, but leading dealers have more or less material on their books sold some time ago, and at prices that are now $1 per ton, or more higher than the prices in effect from April 1. Owing to the scarcity of scrap and difficulty in getting shipments, it is believed that most of this material will be taken in by consumers, and at the prices named in the contracts, as all the consumers in this district are short of scrap, and very anxious to get it. We give below the prices of scrap, mostly fixed by the War Industries Board, and where two prices are named, the lower price represents what the dealers are willing to pay for scrap, and the higher price, the one that consumers are willing to pay to get it. Very few sales have been made in this district for the past month or more, as dealers have not been trying to do business.

Prices on iron and steel scrap, effective from April 1, nearly all of which have been fixed by the Government, for delivery in Pittsburgh and other points that take Pittsburgh freight, are as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	$28.50 to $29.00
No. 1 cast (for steel plants)	29.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., Franklin, Pa., and Pittsburgh	33.50 to 34.00
Hydraulic compressed sheet scrap	24.00 to 25.00
Bundled sheet scrap, slides and ends, f.o.b. consumers' mill, Pittsburgh district	23.00 to 24.00
Bundled sheet stamping scrap	21.00 to 22.00
No. 1 railroad malleable stock	28.00 to 29.00
Railroad grate bars	18.00 to 19.00
Low phosphorus melting stock	38.00 to 39.00
Iron car axles	46.00 to 46.50
Steel car axles	46.00 to 46.50
Locomotive axles, steel	46.00 to 46.50
No. 1 busheling scrap	26.00 to 27.00
Machine shop turnings	18.50 to 19.00
Cast iron wheels	28.00 to 29.00
Rolled steel wheels	34.00 to 36.00
*Sheet bar crop ends	38.00 to 39.00
Cast iron borings	18.50 to 19.00
No. 1 railroad wrought scrap	33.00 to 34.00
Heavy steel axle turnings	23.00 to 24.00
Heavy breakable cast scrap	28.00 to 29.00

*Shipping point.

The American Bridge Co., Pittsburgh, has a contract for the building of four stern-wheel steel steamboats at its Ambridge, Pa., plant for the Carnegie Steel Co., to be used at its Clairton plant. These boats will be each 150 ft. long, 34 ft. wide and 5.3 ft. in depth. Only the hulls will be constructed at Ambridge, while the cabin and machinery will be supplied by the various plants of the company. It is expected to have these boats completed before the end of the year.

Chicago

CHICAGO, April 1 (*By Wire*).

Except in regard to improved production and freer shipments there are few features of a local character worthy of mention. The principal interest is operating 12 blast furnaces at Gary (the full complement) and 10 at South Works. In March it made 435,000 tons of ingots at its two plants—a splendid showing in view of the hamperings early in the month. The coal supply is still unpleasantly uncertain, but the company is heating a new battery of by-product ovens at Gary. When all coke ovens are operating at Gary, the total will be 700. Word comes from Washington that negotiations have been closed whereby Japan is to have 100,000 tons of steel in return for 12 ships. The details are yet to be announced, but it is believed the Japanese will obtain chiefly plates. Government requirements of all sorts continue to appear. There is a large volume of domestic demand, but the mills have little or nothing to offer. The recent price announcement caused hardly a ripple. Mill not entirely self-contained evidently do not believe they were much benefited by what was done. It is figured here that Government car buying will require about 1,000,000 tons of plates and one quarter million tons of shapes. Where the material will be obtained is a query. Makers of car specialties are disturbed over the possibility of standardization setting them aside.

There is some evidence of coming activity in Southern pig iron. The old material market is quiet, the dealers not being inclined to sell in the absence of a commission arrangement. Arrangements have practically been completed for lowering the percentage of manganese contained in standard ferromanganese and spiegeleisen.

Pig Iron.—The market continues extremely quiet so far as selling goes, but offerings are a trifle freer, and there are indications that at least some of the Southern producers who have been out of the market will be selling for last half delivery at an early date. One such company has offered spot shipment of around 1000 tons of iron running 3 per cent and over silicon. A Tennessee furnace will be taking orders shortly for its silvery product, old customers being preferred. Some of these already have been favored with a few hundred tons. An Alabama producer expects to take on last-half business soon, first considering the needs of old customers. For malleable there is a large volume of inquiry, with none offered. A large Birmingham interest has been booking some orders for iron running 1.75 to 2.25 per cent silicon, and the general feeling is that the market is shaping itself for greater activity. Northern furnaces are chiefly concerned with deliveries against their heavy bookings. Where they have given a customer his regular quota of iron they have firmly refused to sell him more. Both charcoal and low phosphorus are scarce, but production of all grades is proceeding at a good pace. The lowering of the price of steel making iron created scarcely a ripple.

The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5	$37.50
Lake Superior charcoal, No. 6 and Scotch	40.00
Northern coke foundry, No. 1	33.50
Northern coke foundry, No. 2	33.00
Northern coke foundry, No. 3	32.50
Northern high-phosphorus foundry	33.00
Southern coke No. 1 foundry and No. 1 soft	38.50
Southern coke No. 2 foundry	37.00
Malleable	33.50
Basic	32.00
Low phosphorus (copper free)	53.00
Silvery, 7 per cent	44.54

Ferroalloys.—Representatives of some makers have set the price of 80 per cent ferromanganese at $275 for last half delivery. They have none for the second quarter. Others are submitting inquiries to their principals. To enable transatlantic use of ships now engaged in bringing manganese ore from Brazil, it seems certain that the percentage of manganese in both ferromanganese and spiegeleisen will be lowered, thus permitting the greater use of domestic ores, which are not as rich in the required element. It is proposed to manufacture 70 per cent ferromanganese instead of 80, and have spiegel run 16 to 18 per cent instead of 18 to 22. The makers have been told that the Government must have the ships to transport men and supplies to Europe and if necessary will commandeer them. Spiegeleisen is quoted at $70, furnace, for last half delivery. Prior to the price going to $275 the ferromanganese market was active.

Plates.—It is estimated that 100,000 freight cars to be built for the Government will require about 1,000,000 tons of plates. How such a requirement will be handled by the already overloaded mills is a big question. In the general situation there is no change. The mill quotation is 3.25c., and that of jobbers 4.45c.

Structural Material.—It is estimated that the cars which the Government will buy will require about one quarter million tons of shapes. From documents sent out by the Railway Business Association, New York, it is gathered that the members of that organization are apprehensive that the Government's plan of standardization will work a hardship to the manufacturers of patented car specialties. A meeting has been called to consider the subject. Meanwhile the mills have no plate capacity that is not engaged to the utmost on Government work. The Kansas City Structural Steel Co. will fabricate 100 tons for a crushing plant for the Utah Copper Co., Magna, Utah. An unknown bidder was awarded 112 tons required for deck plate and plate girder spans for the Minneapolis, St. Paul & Sault Ste. Marie Railway, at Palisade, Minn., and Waukesha, Wis. The American Bridge Co. has the contract for 223 tons required for the Norrie-Aurora mine, Ironwood, Mich. The mill quotation is 3c. and that of jobbers for material out of warehouse 4.20c.

Bars.—The makers are not looking for business in mild steel bars. The demand is good, most of it springing from Government needs. The makers of rail carbon bars can not meet the demands upon them because of the lack of re-rolling rails, the mills being able to operate only intermittently. Bars from discard shell steel are being sold at 2.90c., Chicago, plus 5c. for carbon and 7½c. for deforming, or 3.02½c., Chicago, but Eastern makers ask more. Bar iron is in fair demand, but the makers are not hard pressed. We quote mild steel bars at 2.90c., bar iron at 3.50c. and rail carbon bars at 3c., all Chicago. Jobbers quote:

Soft steel bars, 4.10c.; bar iron, 4.10c.; reinforcing bars, 4.10c., base, with 5c. extra for twisting sizes ½ in. and over and usual card extras for smaller sizes; shafting, list plus 10 per cent.

Sheets.—The leading independent is making no contracts; in fact, is out of the market for the quarter just entered. Consumers in urgent need have canvassed the market with but little result. We quote No. 10 blue annealed at 4.25c., No. 28 black at 5c. and No. 28 galvanized at 6.25c., all Pittsburgh.

We quote for Chicago delivery out of stock, regardless of quantity, as follows: No. 10 blue annealed, 5.45c.; No. 28 black, 6.45c., and No. 28 galvanized, 7.70c.

Wire Products.—Except that production continues to improve and that shipments can be more freely made, there is little to say. We quote:

Nails, $3.50, Pittsburgh; plain fence wire, $3.25; painted barb wire, $3.65; galvanized barb wire, $4.35; polished staples, $3.65, and galvanized staples, $4.35.

Bolts and Nuts.—Conferences are being held in the East relative to changing prices, a fact known to consumers, and meanwhile their attitude is one of waiting. Later a big business is looked for. Where contracts have been made, they are subject to change, if lower prices than now prevail are decreed. For prices and freight rates, see finished iron and steel, Pittsburgh, page 907. Jobbers quote:

Structural rivets, 5.50c.; boiler rivets, 5.60c.; machine bolts up to ⅞ x 4 in., 40 and 10 per cent off; larger sizes, 35 and 5 off; carriage bolts up to ⅞ x 6 in., 40 and 2½ off; larger sizes, 30 and 5 off; hot pressed nuts, square tapped, $1.05 off, and hexagon tapped, 85c. off per 100 lb.; coach or lag screws, gimlet points, square heads, 50 per cent off.

Cast Iron Pipe.—Business is slow, and the foundries have not enough to keep them busy. One or two are down. Niagara, Wis., has given 142 tons to the United

States Cast Iron Pipe & Foundry Co. Springfield, Ill., is taking bids to-day on 1700 tons. Twin Falls, Idaho, on April 18 will let 900 tons. The jobbing trade is fair and Government business light.

Quotations per net ton, Chicago, are as follows: Water pipe, 4-in., $57.30; 6-in. and larger, $54.30, with $1 extra for Class A water pipe and gas pipe.

Rails and Track Supplies.—Light rails continue in good demand, but standard material still awaits Government action. We quote:

Standard railroad spikes, 4.11½c., Chicago. Track bolts, with square nuts, 5.11½c., Chicago. Tie plates, steel, 3.25c.; tie plates, iron, 3.75c., f.o.b. maker's mill. The base for light rails is 3c., f.o.b. maker's mill for 25 to 45-lb. sections, lighter sections taking Government extras.

Old Material.—Still dominated by uncertainty, especially so far as the dealers are concerned, the market is weak. Most of the sellers are not anxious to make any deals until they know better where they stand. The matter of a commission is still in abeyance, and in this regard the dealers are a unit in believing they have not had a square deal. It is felt that in the near future the mills will be compelled to buy. Lists of fair size for the period have been issued by the C., C., C. & St. L., the Lake Erie & Western, C. & M. W. and Pennsylvania lines.

We quote for delivery in buyers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Old iron rails	$38.00 to	$39.00
Relaying rails		60.00
Old carwheels		29.00
Old steel rails, rerolling	33.00 to	34.00
Old steel rails, less than 3 ft		34.00
Heavy melting steel		29.00
Frogs, switches and guards, cut apart		29.00
Shoveling steel	28.50 to	29.00
Steel axle turnings		24.00
	Per Net Ton	
Iron angles and splice bars		$34.21
Iron arch bars and transoms	39.50 to	40.50
Steel angle bars	30.00 to	31.00
Iron car axles		41.52
Steel car axles		41.52
No. 1 railroad wrought		30.36
No. 2 railroad wrought		29.46
Cut forge		29.46
Pipes and flues	23.50 to	24.00
No. 1 busheling	26.00 to	26.50
No. 2 busheling	18.25 to	18.75
Steel knuckles and couplers		30.36
Coil springs		30.36
No. 1 boilers, cut to sheets and rings	21.00 to	22.00
Boiler punchings	32.00 to	33.00
Locomotive tires, smooth	39.00 to	40.00
Machine-shop turnings	16.50 to	17.00
Cast borings	16.75 to	17.25
No. 1 cast scrap	27.50 to	28.50
Stove plate and light cast scrap	23.00 to	23.50
Grate bars	22.50 to	23.50
Brake shoes	24.50 to	25.50
Railroad malleable	28.25 to	28.75
Agricultural malleable	27.50 to	28.50
Country mixed scrap	19.50 to	20.00

Philadelphia

PHILADELPHIA, April 2.

Steel plants, particularly the plate rolling departments, are speeding up both production and shipments, being spurred on by the urgent requirements of the Emergency Fleet Corporation for ships and the Navy Department for submarine destroyers. A large Eastern producer of plates reports that shipments at present are triple the volume of a month ago. Plates are also being rushed to locomotive building shops. The change in prices on basic and Bessemer pig iron has had little effect in this market.

Pig Iron.—There was little activity in the pig iron market following the announcement of new prices on basic and Bessemer iron and the reaffirmation of prices on foundry grades. Contracts for delivery of iron during the second quarter, which were made after the President's announcement of Dec. 28, 1917, are being revised to the new basis, but the view of the trade is that revision is not required on contracts made prior to that date. Considerable iron sold last year for delivery in the first quarter has not been shipped, but if it is shipped in the second quarter it will be billed at the contract prices. General inquiry for large lots has fallen off, but there is still a good demand for small lots of foundry iron, many consumers seeking a carload or two for prompt shipment, but no prompt iron is available. The only large basic inquiry of the week is from the Alan Wood Iron & Steel Co., Philadelphia, which has not sufficient iron to keep its steel production up to the quantity desired by the Government. This company made a fruitless search this week for any quantity that could be had from now until next October. The new price of $32 on basic iron brings basic and forge iron to the same level. A great deal of off-grade basic has been sold recently as forge iron, and under the present price arrangement there will be no financial loss to furnaces which turn out off-grade iron. We quote the following prices on standard grades of iron at furnace, except Virginia iron, for which the delivered price is quoted:

Eastern Pennsylvania No. 1 X	$34.50
Eastern Pennsylvania No. 2 X	33.50
Eastern Pennsylvania No. 2 foundry	33.00
Virginia No. 2 X (including freight)	36.77
Virginia No. 2 foundry (including freight)	36.27
Basic	32.00
Gray forge	32.00
Bessemer	35.20
Standard low phosphorus	53.00
Low phosphorus (copper bearing)	50.00

Coke.—Receipts of coke in this district show a slight improvement, enabling furnaces to operate at a better rate of production. Furnaces which are banked for lack of coke are not sufficiently relieved as yet, however, to resume operations. Coke sellers here receive reports from their principals in the Connellsville region that shortage of cars is the principal factor now in retarding coke deliveries. The return of empty cars to the ovens is not showing the improvement that had been expected. We quote 48 hr. furnace coke at $6, ovens, and 72 hr. foundry coke at $7, ovens.

Ferroalloys.—A meeting of ferromanganese and spiegeleisen producers was held in New York on Monday to discuss the proposed lowering of standards, the Government having suggested that the standard for ferromanganese be lowered to 70 per cent and spiegeleisen to 16 per cent. A leading producer here offers 70 per cent ferromanganese at $250, delivered east of the Mississippi River, with a differential of $4 per unit above or below that price. Spiegeleisen, 16 per cent, has been offered at $70, furnace, and an extra of $3.50 for each unit above 16 per cent. We learn of no sales at these prices. Another large producer adheres to its price of $275, delivered, on ferromanganese, 80 per cent, for first half.

Railroad Equipment.—Action by the Committee on Steel and Steel Products of the American Iron and Steel Institute on fixed prices of wheels, tires and axles will be postponed, it is now expected, until after the letting of car and locomotive orders by the Railroad Administration. Bids for this rolling stock were opened in Washington Monday and the results will probably be announced soon.

Cast Iron Pipe.—There is no great activity in the cast iron pipe market. A local foundry has received an order for 775 tons from Hartford, Conn. The Metropolitan Water District of Boston will let 1000 tons soon. Richmond, Va., has bought a small tonnage. Production is hampered somewhat by labor shortage. Government maximum prices are being fairly well adhered to.

Billets and Slabs.—Very little business is being taken by Eastern mills. A Pennsylvania mill has sold a few small lots of forging billets. The British Government will award an order for 12,000 tons of slabs to an Eastern mill. We quote 4 x 4-in. open-hearth rerolling billets at $50.50, Philadelphia.

Finished Iron and Steel.—Aside from Government orders, the market for plates and shapes is exceedingly quiet. Some makers say there is surprisingly little inquiry, probably because consumers have been repeatedly turned down. Eastern producers of plates are at present shipping very little but Government orders. Rear Admiral Bowles, assistant general manager of the Emergency Fleet Corporation, who is in charge of the Hog Island Shipyard of the American International Shipbuilding Corporation, is speeding up

production of both plates and shapes and their shipment to fabricating shops. The sixth ship keel was laid at Hog Island Monday. Another contract for 60 ships has been awarded the Hog Island shipyard, these to be built after the present contracts for 120 are executed. Lewis F. Shoemaker & Co. are reported to have received an order for 120 portable hangers for the United States Signal Corps. Steel bars and sheets are available in small tonnages. Production of bar iron is hampered by the railroad situation, and shipments of the finished bars are greatly delayed. We quote plates at 3.25c.; plain material, 3c.; steel bars, 2.90c.; No. 10 blue annealed sheets, 4.25c., No. 28 black sheets, 5c., and No. 28 galvanized, 6.25c., all Pittsburgh base, and bar iron at 3.685c., Philadelphia.

Old Material.—Trading is not active in this market because of new difficulties in shipping. Eastern railroads now requires permits for all shipments within the next 10 days or two weeks because of heavy Government traffic to seaboard. There is a serious shortage of No. 1 railroad wrought in dealer's hands, as the railroads have for several months been selling practically all of this material to mills on their lines. We quote the following prices for delivery to eastern Pennsylvania consuming points:

No. 1 heavy melting steel	$28.00 to $29.00
Steel rails, re-rolling	34.00
No. 1 low phosphorus heavy, 0.04 and under	39.00
Low phosphorus, 0.04 and under	36.50
Low phosphorus (not guaranteed)	32.00 to 34.00
Old iron rails	39.00
Old carwheels	29.00
No. 1 railroad wrought	39.00
No. 1 yard wrought	33.00
Country yard wrought	29.00
No. 1 forge fire	26.50 to 27.50
Bundled sheets	26.50 to 27.50
No. 1 busheling	31.00
No. 2 busheling	17.00 to 18.00
Turnings (for blast furnace use)	17.50 to 18.00
Machine shop turnings (for rolling mill use)	18.50 to 19.00
Cast borings (for blast furnace use)	17.50 to 18.00
Cast borings (clean)	19.00
No. 1 cast (for steel plant use)	29.00
No. 1 cast (cupola sizes)	32.00 to 33.00
Grate bars	23.00 to 24.00
Stove plate	23.00 to 24.00
Railroad malleable (for steel plants)	28.00 to 29.00
Railroad malleable (for malleable works)	32.00 to 33.00
Wrought iron and soft steel pipes and tubes (new specifications)	32.00 to 33.00
Ungraded pipe	29.00

Cincinnati

CINCINNATI, April 2—(*By Wire*).

Coke.—The movement of shipments shows some betterment one week to be set back the following week with reports that are not so encouraging. For a while Connellsville operators were apparently able to catch up on some of their overdue shipments, but within the past few days they seem to be lagging again. The main trouble now seems to be a scarcity of cars and the slow movement of the fuel by the railroads after it is loaded. Conditions in the Wise County and Pocahontas fields are almost identical with those in the Connellsville field. In southern Ohio, several iron furnaces are operating very close to shore and they have had before them lately the question of banking on account of a short coke supply. A few new foundry contracts have been made and a number of renewals of old contracts that will soon expire, is reported.

Pig Iron.—A nearby rolling mill wants 15,000 tons of basic for last-half shipment and another melter is quietly asking for approximately 5000 tons for second and third-quarter movement. Little if any of this iron can be had in the Hanging Rock district, and the chance for placing the business with Southern basic makers is not very encouraging. The scarcity of basic iron is daily becoming more apparent, and if the present demand for steel-making iron continues a famine in the metal is a certainty. The foundry iron shortage is not quite so marked, but the furnaces will be hard pressed to take care of their customers through the entire year. Although the inquiry for foundry iron is fairly good, producers are holding back in taking on much more last-half business. Order books in many cases are well filled. Some improvement has been made in the movement of iron from the Birmingham district, and shipments from Ironton are going forward at a much more satisfactory rate than at this time last month. Freight embargoes on some Northern roads are still in existence, but loaded cars that have been held up in Cincinnati yards several days are now being sent through to destination.

Based on freight rates of $2.90 from Birmingham and $1.26 Ironton, we quote f.o.b. Cincinnati, as follows:

Southern coke, No. 2 foundry and No. 2 soft	$35.90
Southern Ohio, No. 2	34.26
Basic, Northern	34.26

Finished Material.—The agreement on prices for the coming three months has enabled jobbers to do business on a more settled basis, but they are not able to plan very far ahead. Recent mill shipments enable the warehouses to fill most all orders promptly, but with the exception of an increased demand for reinforcing concrete rods, there is little change in the structural material situation. Although stocks of wire nails are low, store prices have weakened, and to-day nails can be bought as low as $4 per keg base. All kinds of wire fencing is in heavy demand, especially from the hardware merchants who cater to the agricultural trade. There is no let up in the demand for high speed steel and there seems to be more of an inclination on the part of different manufacturers to adhere more closely to the maximum price of $2 a lb.

Jobbers' prices are as follows: Iron and steel bars, 4.08½c.; twisted bars, 4.36½c. base; structural shapes, 4.18½c.; plates, ¼-in. and heavier, 4.43½c.; No. 10 blue annealed sheets, 5.43½c.; cold rolled shafting, 10 per cent plus list. The mill price on No. 28 black sheets remains at 5.18½c. and on No. 28 galvanized, 6.43½c. The warehouse price on wire nails is unchanged at $4 to $4.10 per keg base.

Old Material.—The uncertainty of the situation has held up transactions to a large extent and sales to consumers of foundry scrap are limited generally to carload lots. Consumers do not seem to order very far ahead, as they are not willing to pile up stocks to carry them further than July 1. Dealers are in the same frame of mind, and as a consequence business is very dull and prices are weak. Only a slight improvement is noted in the movement of scrap to the large consuming centers.

The following are dealers' prices, f.o.b. at yards, southern Ohio and Cincinnati:

Per Gross Ton	
Bundled sheet scrap	$19.00
Old iron rails	$32.00 to 32.50
Relaying rails, 50 lb. and up	44.00 to 44.50
Rerolling steel rails	33.00 to 33.50
Heavy melting steel scrap	26.00 to 26.50
Steel rails for melting	26.00 to 26.50
Old carwheels	28.00

Per Net Ton	
No. 1 railroad wrought	$29.00 to $29.50
Cast borings	13.00 to 13.50
Steel turnings	13.00 to 13.50
Railroad cast	25.00 to 25.50
No. 1 machinery	25.00 to 25.50
Burnt scrap	16.50 to 17.00
Iron axles	40.00 to 40.50
Locomotive tires (smooth inside)	33.50 to 34.00
Pipes and flues	19.00 to 19.50
Malleable cast	24.00 to 24.50
Railroad tank and sheet	17.00 to 17.50

Buffalo

BUFFALO, April 1.

Pig Iron.—The tonnage of pig iron that can be taken on by furnaces for this year's delivery is becoming reduced to narrower limits each week, and furnacemen are unable to entertain acceptance of even a fraction of the tonnage that is seeking placement. Some producers are taking no new orders at all, except where they can occasionally squeeze in a carload or small tonnage for old-time customers, whose imperative needs they feel obligated to care for to the limited extent they are able. Production is being forced all that is possible, making allowance for the difficulties that have to be contended with in the way of irregular deliveries of coke and other supplies and the scarcity of labor. One producing interest reports it does not expect to be able to get out

a pound of iron in excess of commitments for this year. Another is sold up to February, 1919, for everything it will have available and others state they are booked up to full estimated capacity for months. To all appearances, therefore, contracting by Buffalo district furnaces will be on a very limited scale for the next two months at least. Furnacemen estimate that 75 to 80 per cent of product going forward is for Government uses. One furnace of the Donner Steel Co. is to be blown in on basic May 1 and another on ferromanganese on the same date. Basic is reduced $1 per ton, to $32, to comply with price revision announced from Washington and effective this date. We quote as follows, f.o.b. furnace, Buffalo:

No. 1 foundry, 2.75 to 3.25 silicon	$34.50
No. 2 X, 2.25 to 2.75 silicon	33.50
No. 3 foundry, 1.75 to 2.25 silicon	32.50
Gray forge	32.00
Malleable	33.50
Basic	32.00
Lake Superior charcoal, regular grades, f.o.b. Buffalo	37.50

Finished Iron and Steel.—Government pressure for delivery on orders previously placed is occupying practically the sole attention of operating departments of the mills. One or two sales representatives of Pittsburgh and Valley mills that have had limited tonnages of finished materials for sale have been notified by their principals to withdraw entirely from the market for the present. Buffalo district mills, although largely engaged on Government orders, are not so closely sold up, having room for some general business in bars and miscellaneous products for shipment at mill's convenience. The percentage of capacity they can devote to general uses is very limited, however, as about 90 per cent of output is, directly and indirectly, for the Government. Whatever material there is for sale goes, as a rule, to customers of long standing. Bids are to be taken soon for steel for the Fowler Nail Co.'s new plant, this city, which will require about 100 tons of fabricated material for the initial building. Bids will also soon be taken for steel for a barn and storage building for the Buffalo Street Cleaning Department, about 200 tons.

Old Material.—The market for the week shows increasing activity and strength, with a large volume of inquiry and a good many sales made, principally for local delivery. There was, in consequence, very little material available in any line to fill outside inquiry, of which there was considerable. Railroad offerings are before the market this week and will be closed within the next few days, undoubtedly going direct to consumers. An important meeting of the Central Division of the American Board of Scrap Dealers is to be held at Cleveland next week. It will be participated in by representatives of the Eastern and Western divisions, and it is expected there will be a very full attendance, as matters of particular interest to dealers at the present time, in connection with the existing price schedule, are to come up for discussion. The current price schedule embodies the Government revision, which automatically reduces the prices previously in effect about $1 per ton on each commodity. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$29.00
No. 1 low phosphorus, heavy, 0.04 and under	39.00
Low phosphorus, 0.04 and under	36.50
Low phosphorus, not guaranteed	34.00
No. 1 railroad wrought	34.00
No. 1 railroad and machinery cast	34.00
Iron axles	$44.00 to 46.00
Steel axles	44.00 to 46.00
Carwheels	29.00
Railroad malleable	34.00
Machine shop turnings	17.00 to 17.50
Heavy axle turnings	24.00
Clean cast borings	18.00 to 19.00
Iron rails	24.00
Locomotive grate bars	24.00
Stove plate	24.00
Wrought pipe	27.00 to 28.00
No. 1 busheling scrap	29.00 to 30.00
No. 2 busheling scrap	21.00 to 23.00
Bundled sheet stamping scrap	21.00 to 23.00

The American Laundry Machinery Co., Cincinnati, has entered into a contract with the War Department for machining a large number of trench mortars. It is understood that practically all the necessary equipment, which will be special, has been provided.

St. Louis

ST. LOUIS, April 1.

Pig Iron.—The demand for pig iron continues very insistent, with numerous consumers constantly in the market for material, which in most cases they are unable to obtain. The only transactions which are being reported are odd-lot sales made by furnace representatives as these lots appear in the furnace yards or develop otherwise in connection with the regular runs. Of such sales a number are being made by various representatives, but for the most part they are in small tonnages and car-load lots. There has been considerable inquiry in the market for immediate car-load lots to replace shipments delayed in transit and in some cases it has been possible to meet this call either with the odd lots or with iron borrowed from more fortunate consumers. The announcement of the new prices from Washington for the suceeding quarter has occasioned no change in this market, although the past week has shown some effect in the tendency of larger consumers who have needs to await the actual announcement. It is believed by furnace representatives that there will be renewed pressure for last-half delivery material with the opening of the new month and the new period of the Government prices.

Old Material.—The scrap market, which indicated a softening effect in its tendencies last week, continued in the same state to-day, and there was a general recession of figures because of the new Government prices which added to the influence of the feeling which already existed. The dealers continue cautious in their operations, while the consumers are holding off to await the full effect of the new developments. There is evidence that the consumers are in need of material, but they are not willing to enter the market, apparently, until it is more definitely assured that current prices are here to stay for a time. No lists of importance have appeared during the week, though new offerings from the railroads are expected with the opening of the new month, as usual. The disposition to await developments is very general all through the market and there is, therefore, very little trading.

We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows:

	Per Gross Ton	
Old iron rails	$35.00 to	$35.50
Old steel rails, rerolling	33.50 to	34.00
Old steel rails, less than 3 ft.	36.50 to	37.50
Relaying rails, standard sections, subject to inspection	60.00 to	75.00
Old carwheels	28.50 to	29.00
No. 1 railroad heavy melting steel scrap	27.50 to	28.00
Heavy shoveling steel	27.50 to	28.00
Ordinary shoveling steel	26.00 to	26.50
Frogs, switches and guards cut apart	28.00 to	28.50
Ordinary bundled sheet scrap	22.00 to	22.50
Heavy axle and tire turnings	20.50 to	21.00
Per Net Ton		
Iron angle bars	$34.50 to	$35.00
Steel angle bars	28.00 to	28.50
Iron car axles	41.00 to	41.50
Steel car axles	40.00 to	40.50
Wrought arch bars and transoms	40.50 to	41.50
No. 1 railroad wrought	28.50 to	29.00
No. 2 railroad wrought	27.50 to	28.00
Railroad springs	28.50 to	29.00
Steel couplers and knuckles	29.75 to	30.25
Locomotive tires, 42 in. and over smooth inside	36.00 to	36.50
No. 1 dealers' forge	25.50 to	26.00
Cast iron borings	15.50 to	16.00
No. 1 busheling	24.00 to	24.50
No. 1 boilers, cut to sheets and rings	22.00 to	22.50
No. 1 railroad cast scrap	25.50 to	26.00
Stove plate and light cast scrap	20.00 to	20.50
Railroad malleable	25.50 to	26.00
Agricultural malleable	23.50 to	24.00
Pipes and flues	23.00 to	23.50
Heavy railroad sheet and tank scrap	21.50 to	22.00
Railroad grate bars	19.00 to	19.50
Machine shop turnings	15.75 to	16.25
Country mixed scrap	19.50 to	20.00
Uncut railroad mixed scrap	23.00 to	23.50

Finished Iron and Steel.—In the finished products market there has been very little of moment and no consumer demands are appearing because of the knowledge that material cannot be obtained. Movement out of warehouse continues up to and beyond capacity and in

many items sales are ahead of deliveries to the warehouses from the mills. For stock out of warehouse we quote as follows: Soft steel bars, 4.17c.; iron bars, 4.17c.; structural material, 4.27c.; tank plates, 4.52c.; No. 8 sheets, 5.47c.; No. 10 blue annealed sheets, 5.52c.; No. 28 black sheets, cold rolled, one pass, 6.52c.; No. 28 galvanized sheets, black sheet gage, 7.77c.

Coke.—Car conditions still have their bearing on the coke situation and there have been no transactions during the week of any consequence either for immediate or forward delivery. The by-product as well as the beehive oven supplies are still sold up so far as representatives here are concerned.

Birmingham

BIRMINGHAM, ALA., April 1.

Pig Iron.—Alabama operators expected the Government to take action with regard to the price schedule which was officially announced on Wednesday, even to the reduction of $1 per ton on basic; hence had no comment to make other than satisfaction that nothing had been done to upset things. There will probably be neither stimulation nor diminution of disposition to buy or to sell. Operators are concerned wholly in taking care of business on books and watching the interests of their regular customers. Small sales were reported for the week, one company totalling a business of only 700 tons. The disposition to keep out of third quarter selling is firm, and it is difficult to make bookings for that period. The manufacturers continue to complain of the car shortage, one shipping only 400 tons per day with offerings of 1000 tons and more. Box cars are hard to secure in required numbers. Advices from Eastern purchasing agents are that Northern consumers of Southern iron, owing to the delay in shipments, are avoiding Southern iron bookings as far as possible. A Birmingham concern, which has a Northern end, declined a lot of new business offered during the week. Practically all furnace interests are treasuring their unsold capacity. Indications are for still smaller consumption of iron in pipe plants in this district. This will enable the placing elsewhere of a large tonnage heretofore preempted by these interests. One large company which makes basic for others, the only one now doing that, is not affected by the new price ruling, deliveries being on all contracts. There was a considerable quantity of basic on Alabama yards March 1. We quote per gross ton f.o.b. Birmingham, as follows:

No. 2 foundry and soft	$32.00

Cast Iron Pipe.—The tendency in the pipe trade is toward still smaller business incident to a falling off in the Government demands, which have been the mainstay of the makers for many months. Sanitary pipe shops are doing slightly better business than the water pipe makers, but neither are doing very much.

Old Material.—"Moving nicely" is the comment of Alabama purchasers of old material. The supply is fair and steadiness exists in prices with the exception of rearrangements in the steel schedule. We quote, per gross ton f.o.b. Birmingham, as follows:

Old steel axles	$32.00 to $33.00
Old steel rails	27.50 to 28.00
Heavy melting steel	26.00 to 27.00
No. 1 railroad wrought	31.00 to 32.00
No. 1 cast	28.50 to 29.50
Old carwheels	25.00 to 30.00
Tramcar wheels	21.00 to 25.00
Machine shop turnings	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Stove plate	23.50 to 24.50

Coal and Coke.—Alabama operators are satisfied with the zone distribution program. No loss of trade is expected to result. On the other hand, saving of mine car mileage will probably stimulate production. Outside of some domestic coals sold in South Carolina, the zone system will not affect this State, while the demand in the new zone will take care of the amount heretofore shipped to South Carolina. Considerable coke is being shipped to the Pacific coast, and Mexican smelters are making anxious queries, finding difficulty in placing orders. New business is booked in small quantities. A plethora of gondolas, which can be used in Birmingham district delivery, has caused local coke purchasers to issue stop orders for the time being, while shipments out of the State are restricted by the absence of box cars. The 300 beehive ovens of the Sheffield Coal & Iron Co. at Jasper will soon be ready for the torch.

San Francisco

SAN FRANCISCO, March 26.

The iron and steel market on the Pacific Coast is in a more or less unsettled condition. The uncertainty of what changes, if any, will be made in prices at the expiration of the present quarter, added to the fact that the Government is not taking the maximum output of the local mills while the difficulty of getting licenses for foreign shipments amounts almost to prohibition of export are causes for uneasiness. This latter is regarded as especially unfortunate, as the mills had contracted for large shipments to Japan and other allies of the United States before the embargo went into effect. The inability to ship is proving embarrassing both to the mills and to those to whom the shipments were going.

The freight situation is getting better, but this is not bringing much relief to the jobbers, who are finding that the Eastern mills are unable to fill most of their orders. Prices, f.o.b. San Francisco, have been advanced to conform with the advance in freight rates effective March 15, otherwise Government prices are being strictly adhered to, except in certain cases, notably in the case of steel pipe in the southern part of the State, where it is reported that many sales have been made at less than Government prices.

Bars.—The demand for bars continues good. The mills are working to capacity, and the ample stock in the hands of the jobbers is finding ready sale. Outside of Government work there is more activity in bars in this market than any other iron or steel product.

Structural Materials.—The market for structural materials is very quiet. All the heavy structurals are going into Government work. The stock of angles and beams in the jobbers' hands is getting very low. Some shipments of these from the East in 90 days' time have been promised the local jobbers, but their stocks will be quite bare in some shapes if there are no arrivals before that time.

Plates.—The largest contract for plates outside of direct Government purchase was recently signed by the Hercules Powder Co. This contract is said to be for several million dollars. There have been some shipments of plates to jobbers, but not nearly enough to satisfy the market. Most of these plates which pass through the jobbers' hands eventually find their way into Government work, but unless the jobber has definite orders for delivery to shipyards or others doing Government work, he is getting scant consideration from the mills. For that reason the jobbers' stocks are very low. However, if orders are accepted for plates outside of Government work, shipments in from six to eight weeks may be expected.

Sheets.—The sheet market continues unchanged. It is almost impossible to get sheets of any kind. To the general shortage there is now added a serious shortage in galvanized sheets and the jobbers' stocks are almost exhausted.

Wrought Pipe.—The demand continues heavy for wrought steel pipe. A number of projected oil borings are being held up on account of the scarcity. An anomalous condition has arisen in the southern part of California, where wrought pipe is selling at a price below the price fixed by the Government. This in the face of a very real shortage is unprecedented, but it is intimated that the dealers are more interested in the development of the country than in their individual profit.

Pig Iron.—The foundries have a good stock of pig iron on hand, and the six months demanded by the Southern furnaces is not causing any hardship on the Coast. Previous to the European war, nearly all the pig iron used on this Coast came from Europe by

sailing vessel around the Horn. In spite of the tariff, it could be brought here much cheaper than Southern pig could be shipped by rail. This meant that five or six months elapsed after shipment before the pig was received. For this reason the Coast got the habit of ordering its supply a year in advance. Now when the Eastern dealers demand six months' time the local mills are in shape to accept the delay, as their stock is ample, having been accumulated on the basis of ordering a year in advance. For this reason there is a good supply on hand and the market is easy.

Coke.—Very little coke is coming in except for Government purposes or for the use of mills and foundries working directly on Government contract. These latter are getting all the coke they need. The foundries which have been short of coke have managed to secure enough from the larger foundries to tide them over.

Cast-Iron Pipe.—Notwithstanding the increased freight rates the demand for cast-iron pipe continues very fair. There is also some private work for corporations developing, for which bids will not be advertised.

Old Materials.—The market for steel and iron scrap is firm because of the mills having such large orders ahead. The mills are taking all they can get, and the supply is holding up to the requirements. The price is unchanged. While scrap cannot be said to be plentiful the fact that the supply is equal to the demand makes the market a satisfactory one to both the dealer and the foundrymen.

New York

NEW YORK, April 3.

Pig Iron.—The reduction in the price of steel-making pig iron by the Government has had no effect on the local market, unless it is to make the dullness more pronounced. Only very light sales are being made, and all efforts are being concentrated upon shipments. Reports from eastern Pennsylvania indicate furnaces are falling farther behind in shipments, but reports from Alabama, Virginia and Western New York furnaces indicate moderate improvement. Some foundries have been compelled to shut down from time to time on account of inability to obtain sufficient supplies of pig iron and coke. We quote as follows for tidewater deliveries:

No. 1 X	$35.25
No. 2 X	34.25
No. 2 plain	33.75
No. 1 Southern	$39.75 to 40.25
No. 2 Southern (rail and water)	39.00 to 39.25
No. 2 Southern (all rail)	39.15 to 39.65
No. 2 X Virginia	37.02

Ferroalloys.—A new basis of computing values of manganese alloys is up for consideration as a result of the Government's efforts to encourage the use of low-grade manganese ores. The Government has proposed that standard domestic ferromanganese be regarded as containing 70 per cent instead of 80 per cent manganese, and that standard domestic spiegeleisen contain 16 per cent manganese. A meeting of producers was held in New York on Monday to consider this. While no decision has been put out officially, some dealers have already acted and are quoting domestic ferromanganese at $250, delivered, for 70 per cent alloy, with $4 per unit for each unit above or below this standard. This would make the 80 per cent alloy worth $290, delivered. One large domestic maker is asking $275 for regular 80 per cent alloy for delivery in the first half. One British representative here sells regularly on a 76 to 80 per cent basis, guaranteeing a content within these limits. Until the matter is officially arranged quotations remain on the old basis of $250, delivered, for 80 per cent ferromanganese and $70 to $75, furnace, for 20 per cent spiegeleisen. One domestic spiegeleisen producer is already asking $70 for 16 per cent alloy, and $3.50 for each additional unit. No sales on the newly proposed bases are reported. The market for ferromanganese is quite active. Inquiries total several thousand tons in lots of 500 to 1000 tons and less. Sales have been made at $250, delivered, for early and last half delivery. One representative of a British producer has sold 500 tons for April-August delivery. The price involved was not disclosed. Spiegeleisen is also active at $70 to $75, furnace. One lot of 1200 tons of 20 per cent material was sold, with the prospect of about 2000 tons more being closed in a day or so. Inquiries before the market amount to 10,000 to 12,000 tons, and offerings are small. Ferrosilicon, 50 per cent, is quiet. The market may be quoted at $155 to $165 per ton for forward delivery, with spot and early delivery up to $180 and $190, depending on the quantity and delivery asked for. Some consumers have found that they have contracted for more than they can use and are asking for an extension of deliveries into the future. Ferrotungsten is quoted at $2.25 to $2.40 per lb. of contained tungsten, New York, with the ore concentrates selling at between $20 to $24.50 per unit in 60 per cent material, depending on the grade. Ferrovanadium ranges nominally from $4 to $5, Pittsburgh, per lb. of contained vanadium for prompt delivery in small lots, but very little is available, large quantities going into steel on Government orders. Ferro-carbon-titanium, 15 to 18 per cent, is selling at $200 per net ton in carload lots, at $220 per ton in lots between one ton and a carload, and at $250 per ton in lots less than a ton, f.o.b. Suspension Bridge, N. Y.

Finished Iron and Steel.—The reaffirmation of prices on iron and steel products has brought no change in the market. Mills are so well loaded up on bookings under priority orders that they refuse to consider business except in a few lines on which delivery dates can be named with some degree of precision. For example, some sizes of pipe are not difficult to get. Recognizing the situation, the consuming trade is as a rule attempting to buy nothing except on direct or indirect Government business, running meanwhile on such stock as is available or is obtainable from time to time from mills which are trying to help out their long time customers. The principal item of interest is that under the direction of the Director of Steel Supply the committee of the American Iron and Steel Institute on steel distribution has notified plate mills that at least 75 per cent of their out-turn is to be for Government business, and that for the remainder detailed information is to be forthcoming weekly as to volumes of shipments and names of consignees. Details of the unusual conditions obtaining in business in these times are constantly coming to light. Shipments of bar iron products of 10,000 to 40,000 lb. have been made by express, partly to meet urgent needs and to get around freight embargoes in spite of transportation costs of about $1 per 100 lb. Some freight shipments have lately been expedited by sub-dividing billing of carload lots to make the shipment appear as less than carload lots, for which higher freight charges are of course paid, but under which arrangement a movement could be obtained. At this writing the distribution of Government purchases of railroad cars has not yet been made, but an estimate covers 100,000 all told, taking perhaps 1,000,000 tons of plates and 250,000 tons of structural shapes. The quantities talked of comprise 25,000 steel hoppers, 15,000 steel gondolas, 10,000 composite gondolas and 50,000 box cars. Lots of 500 and 1000 tons, some for export to Japan, of shell discard steel rolled into 20 and 40-lb. rails, have been sold. The price obtained is 3c. per lb. for the heavier rail. In fabricated steel work bids are to be taken on April 4 for a power station in Maryland for the Ordnance Department, taking 1000 tons, and on April 15 for 3600 tons for the Culver Line extension, Brooklyn, known as Section 3, Route 49, of the New York subway system. The Southern Railroad is to build a 350-ton bridge in Tennessee. Awards include 700 tons for an office building in the Cramp shipyards; 1500 tons for 95 buildings, probably in New Jersey, for the Atlantic Loading Co., this distributed among a number of fabricators; 900 tons for the crating building for the Quartermaster Department in Baltimore, awarded to the Bethlehem

Steel Bridge Corporation, and 450 tons for a crane runway at the plant of the Worthington Steam Pump Corporation at Harrison, N. J., to the Austin Co. Fabricators have been notified by the Committee on Public Information that resolutions have been passed indicating that the Government does not approve of private building construction for other than war uses, or of the erection of public buildings by state, county or city governments, and that control of the situation will be obtained through the withholding of priority permits. Mill shipments are quoted as follows: Steel bars, 3.095c.; shapes, 3.195c.; plates, 3.445c., and bar iron, 3.695c., all at New York. Out-of-store prices are 1c. higher.

Cast-Iron Pipe.—With the exception of the award of 775 tons by the city of Hartford to a Philadelphia shop no public business of importance is reported. It is intimated that cast-iron pipe manufacturers will soon be called together again to consider prices. Government prices are as follows: $55.35, New York, for 6-in. and heavier and $58.35 for 4-in.; $65.35 for 3-in., and $1 additional for Class A and gas pipe.

Old Material.—Following the reduction of $1 per ton on all kinds of scrap, the market has been weak, especially heavy melting steel, which is selling at about 50c per ton below Government quotations. As no commissions are being paid pending final determination of the commission question, brokers find that the only way in which they can make any money is by buying from dealers at considerably below Government prices and selling at or a little below the Government quotations. This policy is being generally pursued. We quote prices of brokers as follows to New York producers and dealers per gross ton New York:

Heavy melting steel	$26.30 to $26.75
Rerolling rails	31.60
Relaying rails	60.00 to 70.00
Iron and steel car axles	44.00 to 44.30
No. 1 railroad wrought	31.80
No. 1 railroad wrought cut to not less than 10 in. or over 24 in.	36.80
Wrought-iron track scrap	30.80
No. 1 yard wrought long	31.80
Light iron	9.00 to 10.00
Cast borings (clean)	16.80
Machine-shop turnings	16.80
Mixed borings and turnings	14.50 to 15.50
Iron and steel pipe (1 in. minimum diameter), not under 2 ft. long	29.75

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, are:

No. 1 machinery cast	$34.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	34.00
No. 1 heavy cast, not cupola size	29.00
No. 2 cast (radiators, cast boilers, etc.)	$27.00 to 28.00
Stove plate	22.00 to 22.50
Locomotive grate bars	25.00 to 26.00
Malleable cast (railroad)	34.00
Old carwheels	29.00

British Steel Market

Hematite Iron Supply Not Equal to Demand—Japan Pays High Price for Ferromanganese

(*By Cable*)

LONDON, ENGLAND, April 3.

The Cleveland pig-iron market is quieter, but the demand for hematite iron exceeds the supply. American wire rods are not being offered. Tin plates are irregular, some makers lacking orders for early delivery. Ferromanganese is irregular, demand from America being negligible, but for shipment to Japan, £57 f.o.b. has been accepted. We quote as follows:

Tin plates coke, 14 x 20; 112 sheets, 108 lb., f.o.b. Wales, 32s.

Ferromanganese, $250, c.i.f. for export to America; £26 10s. for British consumption.

Ferrosilicon, 50 per cent, c.i.f. £35 upward.

On other products control prices are as quoted in THE IRON AGE of July 19, 1917, p. 171.

With the aid of a Government mediator the difficulties with the striking employees of the Ross Gear & Tool Works, Lafayette, Ind., have been settled and the men are back to work.

Cleveland

CLEVELAND, April 2—(*By Wire*).

Iron Ore.—A meeting of representatives of iron ore firms, consumers, vessel interests, coal shippers and railroads, called by H. G. Dalton, chairman of the Sub-Committee on Pig Iron, Iron Ore and Lake Transportation of the American Iron and Steel Institute, was held at the Hollenden Hotel, to-day. The object of the meeting was set forth in the following paragraph in Mr. Dalton's letter:

> As it is planned this year to have a wider, and we hope, more efficient co-operation between the railroads, vessels, coal shippers and ore shippers and consumers than last, it has been thought wise by our committee to ask the ore shippers and consumers, whether they handle their ore over their own docks or over railroad terminals, to join in a meeting to discuss what methods can best be employed by them to create a free movement of ore during this coming season of navigation, the insurance of a full supply to the consumer and at the same time to deal as lightly with the railroads in the use of their facilities as is possible.

Along the line of the work of co-operation which was inaugurated by the allied interests last year, a new organization has been effected to take charge of the handling of iron ore and coal shipments through Lake ports the coming season, this taking the place of the organization representing the various allied interests that directed the movement and distribution of ore last season. This organization, which will be known as the Coal & Iron Exchange, consists of a super-committee composed of Matthew Andrews of M. A. Hanna & Co., representing the ore interests; H. Coulby, president Pittsburgh Steamship Co., representing the vessel interests; A. S. Ingalls, the railroads; and A. A. Augustus the coal men. Each of the four named members of the committee will be at the head of a sub-committee to be named shortly, which will have direct charge of the work in its particular field. At a meeting of the representatives of the ore, coal and transportation interests late last week Herman M. Griggs was appointed manager of the Coal and Ore Exchange, and will assume his duties at once. Mr. Griggs was formerly coal and coke agent for the New York Central lines. The United States Shipping Board late last week approved the mobilization committee plan for handling shipments on the Great Lakes during the coming season, the members of the mobilization committee having a conference with the Shipping Board at Washington late in the week. Harry Coulby is chairman of this committee that was appointed early in the winter. The mobilization committee will refrain as far as possible from interfering with the individual management of ships, but will assume responsibility for an equitable distribution of tonnage, and will have authority to designate the loading of ships as will best serve the needs of the country.

About 50 attended the meeting, including a good representation of the blast furnaces of the Central West, the remainder for the most part being ore and vessel men.

Mr. Dalton, chairman of the Sub-Committee on Ore and Pig Iron, presided. Co-operation was the keynote of the meeting.

Harry Coulby, president Pittsburgh Steamship Co. and chairman of the Mobilization Committee of the vessel interests, stated that there will be as little disturbance as possible in existing contracts for the shipment of ore. The blast furnace men were asked to supply information as to the amount of ore they had on docks and furnace yards April 1, their expected requirements for the next twelve months, the amount they will want shipped direct and placed on docks this year, and the kind of car equipment they will prefer to have used for its transportation. Carrying charges for ore will probably be fixed at a meeting of the Lake Carriers' Association to be held in Cleveland Wednesday.

Furnace men are showing a little more interest in the ore market than they have for some time. This is doubtless due both to the reaffirmation of ore prices for the next three months and to improved furnace operations. As prices were reaffirmed for only three months, ore sellers have not given up hope of higher prices later in the year, and will probably make some effort

to have an advance made when the question of iron and steel prices for the third quarter is taken up. We quote, delivered lower Lake ports, as follows:

Old range Bessemer, $5.95; old range non-Bessemer, $5.20; Mesaba Bessemer, $5.70; Mesaba non-Bessemer, $5.05.

Pig Iron.—Inquiry is plentiful, mostly for foundry grades, but very little business is being booked, as there is practically no iron unsold in this territory for any delivery this year. There is some demand for small lots of foundry iron for prompt shipment for which consumers are looking in vain. The Standard Parts Co. is inquiring for 2000 tons of foundry iron for the remainder of the year for its Canton plant for Government work. A new basic inquiry has come from southern Ohio for 5000 to 10,000 tons of basic for the remainder of the year. About every basic consumer in Ohio would buy additional iron were it available. The Government has finally placed 1000 tons of foundry iron for Italy with a Southern furnace, Northern iron that was first specified not being procurable. Some additional Government inquiries for lots around 100 tons have come out. There is an active inquiry for Southern iron, but little of this is being sold.

Bessemer	$36.25
Basic	32.30
Northern No. 2 foundry	33.30
Southern No. 2 foundry	37.00
Gray forge	32.30
Ohio silvery, 8 per cent silicon	46.12
Standard low phosphorus, Valley furnace	50.00

Bolts, Nuts and Rivets.—The demand for bolts and nuts has improved. Makers are now closing contracts for the second quarter with manufacturers and jobbers at regular prices. Considerable business is coming out for Government work. Rivet specifications from shipyards are heavy, but new demand is only moderate.

Old Material.—Activity in the scrap market is confined mostly to trading between dealers and to exchange deals between brokers and mills. Mills are buying some material from producers, but dealers are not attempting to take orders because they cannot do business at a profit without charging a commission. Efforts are being made to secure a restoration of commissions, and dealers are of the opinion that efforts in this direction will be successful. The demand for both heavy melting steel and high phosphorus melting scrap is heavy. The market is firm at the new prices on most grades controlled by the Government, which have been reduced $1 a ton. Cast scrap is selling at about $1 a ton under the Government maximum. We quote, f.o.b. Cleveland, as follows:

	Per Gross Ton	
Steel rails	$27.00 to	$28.00
Steel rails, rerolling		34.00
Steel rails, under 3 ft		34.50
Iron rails		39.00
Iron car axles		46.50
Steel car axles		46.50
Heavy melting steel		29.00
Cast borings		19.00
Iron and steel turnings and drillings		19.00
No. 1 railroad wrought		34.00
Hydraulic compressed steel scrap	28.00 to	29.00
Cast iron car wheels, unbroken		29.00
Cast iron car wheels, broken		34.00
Agricultural malleable	24.00 to	25.00
Railroad malleable		34.00
Steel axle turnings		24.00
Light bundled sheet scrap	24.50 to	25.00
Cast iron scrap		29.00
Cast iron scrap, broken to cupola size	33.00 to	34.00
No. 1 busheling	30.00 to	31.00
	Per Net Ton	
Railroad grate bars	24.00 to	25.00
Stove plate	27.00 to	28.00

Due to the tremendous increase in demand for steel grit and sand blasting material for shell purposes, and other government requirements, the Pittsburgh Crushed Steel Co., Forty-first and Allegheny Valley Railroad, Pittsburgh, has trebled the capacity of its plant by the installation of new crushers, screeners, etc. One new type crusher just installed has a capacity of 20 tons per day.

The Union Switch & Signal Co., Pittsburgh, has received some large orders for railway, safety and signaling apparatus.

Steel Co. of Canada's Report

The Steel Co. of Canada, Hamilton, Ont., in the year ended Dec. 31 last, had net profits of $6,040,318, after deducting charges for repairs, maintenance and improvements and providing for war tax. This was $1,018,927 in excess of the previous year. Out of the sum mentioned $515,203 was consumed in paying interest on bonds, while $1,144,741 went in dividends, $454,741 for the preferred and $690,000 for the common stock. The company set aside $177,531 reserve for bond sinking fund, $806,000 reserve for depreciation and $40,000 reserve for fire insurance. For special depreciation for furnace $400,000 was appropriated. There was transferred to betterment and replacement reserve $1,406,486 and $1,550,356 was carried to the credit of profit and loss account.

Robert Hobson, president of the company, reports that satisfactory progress is being made with the by-products coke oven plant which is being installed at Hamilton, and through the medium of which, when completed in November next, it is hoped to insure an ample supply of coke of uniform quality for the company's blast furnaces. "During the year," says Mr. Hobson, "together with other steel companies of the highest standing, we secured two valuable ore properties, one on the Mesaba range and the other on the Gogebic range. The proportion of the ore which we are entitled to receive from these two properties will be sufficient to meet over half of our total ore requirements each year for a considerable number of years."

The Union Twist Drill Co., Athol, Mass., has made a remarkable gain in net quick assets in the last three years. At the end of 1915, the net quick assets were $851,874, but during the two following years they were more than quadrupled to $3,707,490. Its surplus on Dec. 31, 1915, was $613,892, and on Dec. 31, 1917, $2,306,919. The proportion of net quick assets to preferred stock at the end of 1917 was 137 per cent, at the end of 1916, 92 per cent, and at the end of 1915, only 30 per cent. After allowing the regular 6 per cent preferred dividend, the balance of profits available for the common stock exceeded $160 a share for 1917, against $135 a share earned in 1916, and about $38 in 1915.

The Virginia Iron, Coal & Coke Co. has issued its report covering the fiscal year ended June 30, 1917, and the six months ended Dec. 31, 1917. Net profits for the twelve-month period amounted to $1,024,364, equivalent to $10.24 a share on $10,000,000 of stock, as compared with a deficit of $248,094 reported for the preceding fiscal year. Gross earnings for the six months ended Dec. 31 last amounted to $5,314,323 and net earnings were $1,283,820. The net profit for the period was $873,179 after all charges, including $216,650 for taxes and $121,099 for bond interest.

Indianapolis is to have a war training school, the Government having closed a contract for one. The Chamber of Commerce of the city assumes responsibility for training 500 drafted soldiers as gunsmiths, blacksmiths and automobile, airplane and engine mechanics. In addition to the shops at Emmerich Manual Training High School and the Arsenal Technical School, floor space will be obtained in factory buildings. The Metropole Hotel has been leased to house the men. The school will open about April 10.

George W. Goethals & Co., Inc., 40 Wall Street, New York, has been retained by the dock commission of the Port of New Orleans to act as consulting engineer in the construction of an industrial canal and locks connecting Lake Pontchartrain with the Mississippi River. The Government has approved a bond issue of $3,500,000 for preliminary work. Actual construction work will be in charge of George M. Wells, of the company.

OBITUARY

WALTER A. BUXTON, a widely known scrap metal dealer, died at his home in Worcester, Mass., March 30, from a hemorrhage of the brain. He was born in Worcester in 1876 and was educated at Ohio Wesleyan University, Amherst and Harvard. After leaving college he became associated with his father in the business of E. Buxton & Son Co., Worcester, of which he soon became general manager. Under his administration the business was extended to other cities, and he was instrumental in the formation of the Buxton-Doane Co., Boston, and later of the Perry-Buxton-Doane Co. Mr. Buxton retired from the business in 1913 on account of ill health and after a year of retirement, in 1914, started in business for himself in Worcester.

A. E. SPOONER, assistant chief engineer of the Brown Hoisting Machinery Co., Cleveland, died March 25, age 53 years. For many years he had looked after the ore-handling equipment of the company and was well known among men associated with blast furnaces and ore docks. He had been with the company 31 years. He was a graduate of the Case School of Applied Science, Cleveland, being a member of the first graduating class of that school.

SAMUEL LEEDS ALLEN, head of S. L. Allen & Co., Philadelphia, manufacturers of agricultural implements at Fifth Street and Glenwood Avenue, Philadelphia, died last week at Miami, Fla., where he and his family had gone for the winter. Mr. Allen was born in Philadelphia 67 years ago. He began the manufacture of farm implements after many years of experience at farming in New Jersey.

HORACE W. WILLSON, for 56 years employed by the American Steel & Wire Co. and its predecessor, the Washburn & Moen Co., died March 24, at his home in New York. Mr. Willson was a widely known salesman and was tendered a banquet by officials of the company at the time that he completed 50 years of service. He retired from active work in 1913.

AUSTIN CLEMENT, president Page Steel & Wire Co., died in a hospital at Chicago, March 30, after a long illness. He had been a resident of Chicago for many years. He was born in Bridgewater, Vt., in 1842. He leaves two sons, Allen M. and Arthur A., both residents of Chicago.

WILLIAM THOMPSON DRUMMOND, 58 years of age, president of the Drummond Mfg. Co., operating a foundry in Louisville, died on March 26, following a brief illness. Mr. Drummond had been connected with the company since he was 19 years of age.

J. R. VAN ORMER, who had been connected with the Lukens Steel Co., Coatesville, Pa., for 22 years, died March 27, after a lingering illness of seven years, aged 59. He was general sales agent of the company for about 18 years.

MORRIS W. MILLER, president Ney Mfg. Co., Canton, Ohio, died March 15 of apoplexy, age 71 years.

Electric Furnaces Go to Higher Capacities

With the advent last year of 20-ton electric furnaces and indications of an advance to a standard maximum of 30 tons, the General Electric Co. developed a system of automatic control to handle the motive power necessitated. The improvements became necessary as the rate of steel production in these furnaces had been increasd by the use of higher capacity transformers and higher voltages, which permitted forcing power into the furnaces at considerably higher rates.

The higher power used can be seen by taking, for example, the 6-ton furnace, which is the size in greatest general use. The transformer capacity has increased from 900 kva. to 1500 kva., and even 1800 kva. has been proposed, all these capacities being based on 100 volts. In the variable voltage equipments the successful use of 150 volts renders it possible to increase the normal 1500 kva. up to 2250 kva.

Although 100 volts remains standard for refining, voltages up to 173 have been used for melting, these voltages being obtained either by high voltage taps or high voltage Y-delta connections. The use of high voltages during melting down is to permit of decreasing the current for a given input, to improve the power factor, and to insure higher emergency input when most needed.

Large Canadian Contracts

The Canadian Car & Foundry Co., Montreal, will participate to the extent of about $16,000,000 in new orders for railroad equipment placed by the Canadian Government. The orders total about $22,500,000, one of the largest contracts ever placed in Canada. The bulk of the equipment, especially box and ballast cars, will be for the Canadian Northern Railway. The allotment of the contract is reported to have been made to three companies on the following basis: Canadian Car & Foundry Co., Montreal, 5000 40-ton steel frame box cars, 450 40-ton wood ballast cars and 300 30-ton stock cars valued at $16,000,000. Eastern Car Co., Trenton, N. S., 750 40-ton steel frame flat cars and 650 50-ton steel coal cars valued at $3,750,000. National Steel Car Co., Hamilton, Ont., 1000 40-ton steel frame box cars valued at $2,750,000. It is expected that contracts for 150 locomotives will be awarded at an early date.

Stockholders of the Charcoal Iron Co. of America, at the annual meeting, elected A. A. Fowler of New York a director to succeed A. L. Fullerton of London, England, who has been made the company's European representative. Mr. Fowler is a member of the firm of Rogers, Brown & Co. Directors are F. M. Harrison, A. A. Fowler, New York; John W. Mitchell, Toronto; George J. Webster, Marquette; Dr. Edgin Lodge, Henry M. Campbell and Frank W. Blair, Detroit. The board of directors re-elected the officers of the company.

The Pittsburgh Testing Laboratory, Pittsburgh, has turned over to the United States Government its building and equipment at Seventh and Bedford Avenues, Pittsburgh, for the duration of the war. Until about June 15 offices will be in the B. F. Jones Law Building, Fourth Avenue and Ross Street. After that date, the offices and laboratories will be located at 612-620 Grant Street, which buildings are being remodeled and equipped for the special needs of the testing laboratory.

The Interstate Iron & Steel Co., Chicago, has found it necessary to enlarge its offices. It has leased half of the fourteenth floor of the Monroe Building, 104 South Michigan Avenue, Chicago. The sales department at the Grand Crossing plant, which was recently made a part of the Interstate Iron & Steel Co., will be combined with the general sales offices, and will also be moved to the Monroe Building. It is expected that the change will be completed by April 6.

The Aborn Steel Company, Inc., 22 Clarke Street, New York, 269 Drexel Building, Philadelphia, and 133 Andrews Street, Rochester, N. Y., has been appointed sales agent for the Century Steel Co. of America, Inc., manufacturer of crucible steels, Poughkeepsie, N. Y. The Century company has given up its New York office and warehouse, and the Aborn Steel Co., Inc., will carry Century products in stock.

The Frank H. Seely, Jr., Co., is successor to the Pennsylvania Supply & Equipment Co., Philadelphia. The office is at 421 Widener Building. This is a change in firm name only, and was effective April 1.

Liberty Steel Products, Co., Inc., Woolworth Building, New York, has opened a western branch office in the Newhall Building, San Francisco, in charge of A. L. Martin, district manager.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh on iron and steel articles, aside from wrought iron and steel pipe in carloads, per 100 lb., New York, 19.5c.; Philadelphia, 18.5c.; Boston, 21.5c.; Buffalo, 11.6c.; Cleveland, 13.5c.; Cincinnati, 18.5c.; Indianapolis, 20c.; Chicago, 21.5c.; St. Louis, 27c.; Kansas City, 47c.; minimum carload, 36,000 lb.; St. Paul, 40c.; minimum carload, 36,000 lb.; Denver, 79c.; minimum carload, 36,000 lb.; Omaha, 47c.; minimum carload, 36,000 lb.; New Orleans, 30.7c.; Birmingham, 46c.; Pacific Coast, $1.00; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is $1.05, minimum carload, 40,000 lb.; and $1.00, minimum carload, 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 40c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 40c., minimum carload 46,000 lb.; to St. Paul, 35.5c., minimum carload 46,000 lb.; Denver, 79c., minimum carload 46,000 lb. A 3 per cent transportation tax now applies. On iron and steel items not noted above, rates vary somewhat, and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in. angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, structural sizes, 3c.

Wire Products

Wire nails, $3.50 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails taking an advance over this price of $2, and shorter than 1 in., $2.50. Bright basic wire, $3.35 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.25; galvanized wire, $3.95; galvanized barb wire and fence staples, $4.35; painted barb wire, $3.65; polished fence staples, $3.65; cement-coated nails, $3.40 base; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 47 per cent off list for carload lots, 46 per cent for 1000-rod lots, and 45 per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large rivets ..... $4.65 base
7/16 in. x 6 in. smaller and shorter rivets. 45-10 per cent off list
Machine bolts h.p. nuts, ⅝ in. x 4 in.:
Smaller and shorter, rolled threads.... 50-10-5 per cent off list
Cut threads ..... 50-5 per cent off list
Larger and longer sizes ..... 40-10 per cent off list
Machine bolts c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter ..... 40-10 per cent off list
Larger and longer ..... 35-5 per cent off list
Carriage bolts, ⅜ in. x 5 in.:
Smaller and shorter, rolled threads ..... 50-5 per cent off list
Cut threads ..... 40-10 per cent off list
Larger and longer sizes ..... 40 per cent off list
Lag bolts ..... 50-10 per cent off list
Plow bolts, Nos. 1, 2, 3 ..... 50 per cent off list
Hot pressed nuts, sq., blank ..... 2.50c. per lb. off list
Hot pressed nuts, hex., blank ..... 2.30c. per lb. off list
Hot pressed nuts, sq., tapped ..... 2.30c. per lb. off list
Hot pressed nuts, hex., tapped ..... 2.10c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank ..... 2.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped ..... 2.00c. per lb. off list
Semi-finished hex. nuts:
⅝ in. and larger ..... 60-10-10 per cent off list
9/16 in. and smaller ..... 70-5 per cent off list
Stove bolts ..... 70-10 per cent off list
Stove bolts ..... 2½ per cent extra for bulk
Tire bolts ..... 70-10-5 per cent off list

The above discounts are from present lists now in effect. All prices carry standard extras.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $57; chain rods, $65; screw, rivet and bolt rods and other rods of that character, $65. Prices on high carbon rods are irregular. They range from $70 to $80, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16 in. x 4½ in. and heavier, per 100 lb., $3.90, in lots of 200 kegs of 200 lb. each, or more; track bolts, $4.90. Boat spikes, $5.25 per 100 lb., f.o.b. Pittsburgh.

Terne Plate

Effective Nov. 7 prices on all sizes of terne plates are as follows: 8-lb. coating, 200 lb., $15 per package; 8-lb. coating, I. C., $15.30; 12-lb. coating, I. C., $16.75; 15-lb. coating, I. C., $17.75; 20-lb. coating, I. C., $19; 25-lb. coating, I. C., $20; 30-lb. coating, I. C., $21; 35-lb. coating, I. C., $22; 40-lb. coating, I. C., $23 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.90c. from mill, and 4.50c. to 5c. from warehouse in small lots for prompt shipment. Refined iron bars, 3.50c. in carload and larger lots, f.o.b. mill.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card, as announced Nov. 5 by the Government on steel pipe, those on iron pipe being the same as quoted for some time:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛, ¼ and ⅜	44	17½	⅛ and ¼	23	+4
½	48	33½	⅜	24	+3
¾ to 3	51	37½	½	28	10
			¾ to 1½	33	17

Lap Weld

2	44	31½	1¼	18	3
2½ to 6	47	34½	1½	25	11
7 to 12	44	30½	2	26	12
13 and 14	34½	..	2½ to 6	28	15
15	32	..	7 to 12	25	12

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	40	22½	⅛, ¼ and ⅜	22	5
½	45	32½	½	27	14
¾ to 1½	49	36½	¾ to 1½	33	18
2 to 3	50	37½			

Lap Weld, extra strong, plain ends

2	42	30½	1¼	19	4
2½ to 4	45	33½	1½	25	11
4½ to 6	44	32½	2	27	14
7 to 8	40	26½	2½ to 4	29	17
9 to 12	35	21½	4½ to 6	28	16
			7 to 8	20	8
			9 to 12	15	3

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent. Prices for less than carloads are four (4) points lower basing (higher price) than the above discounts on black and 5½ points on galvanized.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh, announced Nov. 13, as agreed upon by manufacturers and the Government:

Lap Welded Steel		*Charcoal Iron*	
3½ to 4½ in.	34	3½ to 4½ in.	12½
2½ to 3¼ in.	24	3 to 3¼ in.	+ 5
2¼ in.	17½	2½ to 2¾ in.	+ 7½
1¾ to 2 in.	13	2 to 2¼ in.	+22½
		1¾ to 1⅞ in.	+35

Standard Commercial Seamless—Cold Drawn or Hot Rolled

Per Net Ton		Per Net Ton	
1 in.	$340	1¾ in.	$220
1¼ in.	280	2 to 2½ in.	190
1⅜ in.	270	2¾ to 3¾ in.	180
1½ in.	250	4 in.	200
		4½ to 5 in.	220

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiation.

Sheets

Makers' price for mill shipments on sheets of United States standard gage in carload and larger lots, are as follows, 30 days net or 2 per cent discount in 10 days:

Blue Annealed—Bessemer	Cents per lb.
No. 8 and heavier	4.20
Nos. 9 and 10	4.25
Nos. 11 and 12	4.30
Nos. 13 and 14	4.35
Nos. 15 and 16	4.45
Box Annealed, One Pass Cold Rolled—Bessemer	
Nos. 17 to 21	4.80
Nos. 22 and 24	4.85
Nos. 25 and 26	4.90
No. 27	4.95
No. 28	5.00
No. 29	5.10
No. 30	5.20
Galvanized Black Sheet Gage—Bessemer	
Nos. 10 and 11	5.25
Nos. 12 and 14	5.35
Nos. 15 and 16	5.50
Nos. 17 to 21	5.65
Nos. 22 and 24	5.80
Nos. 25 and 26	5.95
No. 27	6.10
No. 28	6.25
No. 29	6.50
No. 30	6.75
Tin-Mill Black Plate—Bessemer	
Nos. 15 and 16	4.80
Nos. 17 to 21	4.85
Nos. 22 to 24	4.90
Nos. 25 and 27	4.95
No. 28	5.00
No. 29	5.05
No. 30	5.05
Nos. 30½ and 31	5.10

Metal Markets

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin,	Lead		Spelter	
		Electro-	New	New	St.	New	St.
Mar.	Lake	lytic	York	York	Louis	York	Louis
26	23.50	23.50	*85.00	7.20	7.00	7.37½	7.12½
27	23.50	23.50	*85.00	7.20	7.00	7.37½	7.12½
28	23.50	23.50	*85.00	7.20	7.00	7.25	7.00
29	23.50	23.50	*85.00	7.20	7.00	7.25	7.00
30	23.50	23.50	*85.00	7.20	7.00	7.25	7.00
Apr. 1	23.50	23.50	*85.00	7.20	7.00	7.25	7.00

*Nominal

NEW YORK, April 3.

Dullness and a tendency toward an easier tone pervade all the markets. Copper is without change in any phase. Business in tin is restricted though demand is good. Lead is quite inactive and easier. Weakness in spelter has continued and the metal is lower on moderate dealings. Antimony is less strong.

New York

Copper.—The market is bare of new developments of any kind and is entirely devoid of interest. It has narrowed down to a question of supply and demand which at present continue about evenly balanced. Consumption is on a very large scale and production is increasing as the weather continues to improve. Supplies of raw metal to Eastern refineries are reported to be more ample and output is increasing rather than diminishing. Domestic consumption, which means that outside of actual war demand, is not large for most users of copper are really contributing directly or indirectly to Government needs. Government prices of 23.50c. for carload and of 24.67½c. for less than carloads are in force until June 1 when an effort will be made to advance these because of the rising cost of production and other conditions.

Tin.—The scarcity of sellers, which was called attention to last week as being a feature, continues to exercise a retarding influence on activity. There are plenty of buyers of future tin but few sellers. It is very difficult for buyers to get supplies and if more tin were offered it could be easily sold. In the last week a moderate amount of business is reported. It was confined to May and June shipment from the Far East. Delays in cablegrams continue. This, together with the reasons mentioned above, is the cause for the general dullness. Deliveries of tin in March at Atlantic ports were 1700 tons with stocks and landing on March 31 placed at 134 tons. The quantity afloat is about 6300 tons. The London market is unchanged at £317 10s per ton for spot Straits.

Lead.—The market is very quiet, particularly in the East where it is slightly easier and where very little business has been done. In the West reported offerings at 7c., St. Louis, are heard of but it is believed that the volume has not been large. The entire situation is a drifting one. We quote the New York outside market at 7.20c. with 7c. as the St. Louis quotation. The American Smelting & Refining Co. continues to quote 7.25c., New York. A drop in this is looked for by some.

Spelter.—The weakness, which has been apparent for several weeks and which was quite evident a week or so ago, has further developed until yesterday the quotation for April, and even May and June, was 7c., St. Louis, or 7.25c., New York, for prime Western. Sales at this level have not been large though some 100-ton lots have been bought. The lower levels are due largely to a desire on the part of some to obtain cash and then to possibly discontinue production. Until supplies grow smaller, a stronger market is not looked for. Grade A spelter is officially quoted at 12c. per lb. with sheet zinc at 15c.

Aluminum.—Government prices dominate this market. For 50-ton and larger lots, 32c. per lb. is asked with 32.10c. for 15 to 49 tons and 32.20c. for a range of 1 to 14 tons. No prices have been fixed yet on scrap.

Antimony.—On very moderate sales and because of very little demand, the market is lower at 13c., New York, duty paid, for Chinese and Japanese grades.

Old Metals.—The market is quiet. Scrap copper and brass are generally unchanged while lead and zinc are a little lower. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible	23.50
Copper, heavy and wire	23.50
Copper, light and bottoms	21.00 to 21.50
Brass, heavy	16.25 to 16.50
Brass, light	12.25 to 12.50
Heavy machine composition	23.75 to 24.00
No. 1 yellow rod brass turnings	13.50 to 14.00
No. 1 red brass or composition turnings	19.00 to 20.00
Lead, heavy	6.62½
Lead, tea	5.75
Zinc	5.87½

Chicago

APRIL 1.—Word reached here by wire to-day that copper producers have ceased quoting, the reason not being given, although it is supposed they desire to accumulate stocks, especially of certain grades. Metal has been arriving in good quantity and consumption has been large. Tin is largely nominal. Considerable is in sight, but Governmental restriction makes it difficult for all demands to be appeased, and some probably never will be satisfied. Spelter and lead are quiet, with plenty of lead offered and few takers. Antimony is weak. Copper is quoted in carload lots at 23.50c.; in part carloads at 24.67½c. We quote lead at 7c. to 7.05c., tin at 86c. to 90c., spelter at 7.10c. and antimony at 15c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 21c.; copper clips, 20c.; copper bottoms, 19c.; red brass, 20c.; yellow brass, 14.50c.; lead pipe, 5.50c.; zinc, 5c.; pewter, No. 1, 45c.; tin foil, 50c., and block tin, 60c.

St. Louis

APRIL 1.—The market has been quiet with very little variation in quotations, which to-day are, on carload lots: Lead, 7.10c. to 7.15c.; spelter, 7.50c. In less than carload lots: Lead, 7.50c. to 7.60c.; spelter, 8.25c.; tin, 90c.; copper, 25.12c.; Asiatic antimony, 17.50c. In the Joplin district zinc ore prices were weak and the top price was reduced to $62.50 per ton, basis 60 per cent, with the range down to $47.50 per ton. Some low grade ore sales were made as low as $40 per ton. The average for the week for the district was $48 per ton because of the prevalence of low-grade material, top grades being held out. Calamine ranged from $30 to $35 per ton, basis 40 per cent, with the average for the district $35 per ton because of the premium grades which were brought in and sold. Lead was steady at $85 per ton, basis 80 per cent, with the average for the week at $85 per ton, much high-grade ore being sold. On miscellaneous scrap metals we quote as follows, dealers' buying prices: Light brass, 10c.; heavy yellow brass, 14c.; heavy red brass and light copper, 19.50c.; heavy copper and copper wire, 20c.; pewter, 25c.; tinfoil, 50c.; zinc, 5c.; lead, 5.50c.; tea lead, 5c.

After demands for an increase of 15 per cent in wages and an equalization of the scale of paying the drill-making department of J. T. Slocomb, Providence, R. I., had been refused by the management, 22 men walked out on strike. The men were not organized.

The annual meeting of stockholders of Republic Iron & Steel Co., will be held in Jersey City, N. J., on Wednesday, April 17 for the transaction of general business, and also to vote on the election of four directors for the three-year term.

S. R. Scott & Company, Inc., are shippers from Brazil of Manganese ore, ziroconium, monazite sand and other raw minerals. They have a New York office at 29 Broadway.

Regulation of the Tin-Plate Industry

Proposal to Place It Under the Control of the Food Administration—Seizure of Dutch Ships and Imports of Banca Tin

WASHINGTON, April 2.—The liveliest interest is manifested here in the tin situation because of the strenuous efforts of the House Committee on Agriculture to secure an early consideration of the supplemental Lever bill, transferring the supervision of tin for container purposes from the Tin Conservation Committee to the food administrator, and in the interruption of steamship communication with the Dutch East Indies as the result of the seizure of Dutch vessels in American ports or that may arrive at such ports pending the conclusion of the new agreement with Holland. Increasing quantities of tin have reached the United States from the Dutch East Indies in the last three years, but pending the settlement of the bitter controversy with the Netherlands Government, no more Dutch shipping will enter American ports.

Claims of Mr. Hoover

The bill, to strengthen the original Lever act providing for the conservation and distribution of food, feed and fuel, was recently reported from the House Committee on Agriculture after a hearing in which Mr. Hoover declared that the Tin Conservation Committee lacked legal authority to impose restrictions on the use of tin plate which ought to be speedily imposed so as to provide a sufficient food supply for the armies of the United States and the Allies. The bill, as reported, authorizes the food administrator to regulate the supply and distribution of all articles "employed for the preservation of food," a term which Mr. Hoover explained was intended to cover tin plate used for containers. This provision, Mr. Hoover says, not only will give him authority over containers made for food purposes, but over the entire domestic production and importations of tin plate regardless of the use to which it is put. In view of the wide use of this commodity, considerable opposition to Mr. Hoover's proposal has developed in the House.

How Great Britain Controls the Industry

The policy of the Food Administration and of the War Trade Board, which recently issued regulations governing the exportation of tin plate, is now said to be due in large part to the attitude of the British Government which virtually controls the tin supply and which apparently does not intend to increase the tin allowed the United States in the last year. Because the United States is now making great efforts to increase the food supply of the Allies and is shipping large quantities of tinned goods to the British and the French forces, the feeling has been strong that Great Britain should be willing to increase the allotment of tin coming to this country. There are no indications that this will be done. On the contrary, the British Government is now taking the position that the amount of tin allotted to the United States would be adequate if we were to impose the same restrictions as are imposed in the United Kingdom. For a year or more Great Britain has rigidly limited the use of tin plate employed in the manufacture of containers to such as are used for the preservation of food and has refused to make any concessions even where her own industries suffered.

The British authorities state that the United States has permitted quantities of tin containers to be shipped to Canada for various purposes aside from food preservation, notwithstanding the fact that Canadian companies were unable to secure British plate or cans. Responding to this, the War Trade Board recently placed a limited embargo on exports of tin to Canada and is now refusing licenses for shipments of tin cans for any other purpose than the preservation of food. The issuance of this regulation without notice has worked a serious hardship to numerous American companies having branches in Canada, and has also prevented some large can manufacturers from filling Canadian orders taken many months ago.

To relieve this situation, the War Trade Board is considering an amendment to the regulations allowing licenses to be granted for the exportation of cans which were ordered, manufactured and ready for shipment prior to Feb. 14, the date of the President's latest proclamation requiring the licensing of all exports. Obviously this amendment would only take care of exportations made before March 1, and if adopted will not afford any relief hereafter.

The British Government has not been able to make a strong point of the fact that the United States, in the last three years, has exported very large quantities of tin plate, because, although our shipments in 1917 aggregated 233,300 gross tons, an increase of 3 per cent over 1916 and of 51 per cent over 1915, the figures for destination indicate clearly that the bulk of it either went directly to the Allies or was used for their benefit.

Effect on Receipts of Dutch Tin

What effect the interruption of commerce with the Dutch East Indies may have upon the tin situation, no one here will venture to predict. All the conditions are vague and undetermined chiefly because, up to the very moment when the order was issued for the seizure of the Dutch vessels, the Administration hoped that an amicable arrangement would be made with the Dutch Government which would have limited the taking over to certain specified vessels. This would have left the colonial commerce of Holland unrestricted and all Dutch vessels sailing from the East Indian ports with tin, rubber and other commodities would have been permitted to unload promptly and depart without any restriction whatever. The unwillingness of the Dutch Government to offend Germany by making a voluntary arrangement with the United States has produced a strained situation and pending its settlement it is not to be expected that any more Dutch ships will visit American ports.

How long this condition of affairs will continue no one can say nor is it possible to secure an opinion as to whether merchandise from the Dutch East Indies or from Holland can be shipped to the United States by vessels flying other flags. The Dutch and American Governments are now endeavoring to reach an agreement, but each side is determined to sacrifice no advantage.

W. L. C.

Tin Ore in Virginia

As tin is a war-time necessity, and as a domestic supply is urgently needed, all known deposits of tin ore, cassiterite, in the United States have recently been examined by geologists of the U. S. Geological Survey. One of the most promising is in the Irish Creek district, in the eastern part of Rockbridge County, Va., near the summit of the Blue Ridge. This deposit was recently examined by H. G. Ferguson, of the Survey.

The existence of tin ore in the Irish Creek district has been known for many years, and between 1883 and 1893 the deposit there was actively mined. The mining company, however, became involved in litigation as to land titles and abandoned work in 1893. Work on the deposit was never resumed, and the old workings are now caved and heavily overgrown with brush, so that a thorough examination of them is difficult. It is believed that the district is worthy of further investigation.

PERSONAL

A. W. Henn was elected president of the National Acme Co., Cleveland, at the recent annual meeting of the directors, succeeding W. D. B. Alexander, who was made chairman of the board. Mr. Henn had been secretary and treasurer, and retains the treasurer's duties in connection with the presidency. E. C. Henn was re-elected vice-president and N. S. Rathburn was elected secretary. The story of the National Acme Co. and A. W. Henn's connection with it begins in Hartford, Conn., back in 1897, when Mr. Henn and his brother, E. C. Henn, organized the Acme Machine Screw Co. and began the building of a line of automatic machines, Mr. Henn being secretary of this company from 1897 to 1899, and secretary and treasurer during the next two years. During the first year six men were on the payroll, including Mr. Henn and E. C. Henn. In 1899 Mr. Henn went to Cleveland and sold some of his machines to W. D. B. Alexander, who was at the head of the National Screw & Tack Co., and who started to manufacture machine screw products under the name of the National Mfg. Co. Two years later, in 1901, Mr. Henn and Mr. Alexander combined their interests under the name of the National Acme Mfg. Co., and during the next year completed a manufacturing plant which is at present a part of the large Cleveland plant of the National Acme Co., which some time ago changed its name from the National Acme Mfg. Co. Mr. Henn was secretary of the company from 1901 to 1908, and since the death of the former treasurer in the latter year has been both secretary and treasurer.

A. W. HENN

James A. Campbell, president Youngstown Sheet and Tube Co., Youngstown, Ohio, and L. E. Block, president Inland Steel Co., Chicago, have been added to the Committee of Steel and Steel Products of the American Iron and Steel Institute. Mr. Campbell has just gone to Hot Springs, Ark., for a three or four weeks' vacation.

A. W. Wheatley, for the past two years at the head of the Lima Locomotive Corporation, Lima, Ohio, will retire from active management of that company, but for the present will retain his office as president and member of the board of directors. W. L. Reid, Schenectady, N. Y., formerly superintendent of the Baldwin Locomotive Co.'s plant, has become connected with the Lima company as vice-president in charge of manufacture. He and L. A. Larsen, secretary-treasurer and assistant to the president, will have active control of the plant.

Robert E. Frame, for six years assistant to the president of the Haskell & Barker Car Co., Michigan City, Ind., resigned, effective March 1, and has been elected vice-president of the Hutchins Car Roofing Co., Detroit.

John W. Higgins, president Worcester Pressed Steel Co., Worcester, Mass., was elected president of the New England Safety Council at its annual meeting in Boston, March 21.

J. E. A. Moore, 1900 Euclid Building, Cleveland, announces that he will continue the engineering practice now carried on under the partnership of Marani & Moore. V. G. Marani's out-of-town interests occupy his full time. Mr. Moore will give special attention to various lines of engineering work, including manufacturing plants, their operation and equipment, special process of development and design, conveying, elevating and special machinery, steel construction, etc.

W. P. Snyder, president of the Shenango Furnace Co., Pittsburgh, has returned from an extended vacation spent at Palm Beach, Fla.

W. T. Bohn, formerly employment manager of the Aluminum Castings Co., Cleveland, has been elected secretary of the Founders' Association of Cleveland.

Whiting William, formerly secretary of the Cleveland Welfare Federation, has been placed in charge of the welfare work of the three Cleveland plants of the Hydraulic Pressed Steel Co.

W. F. R. Whittington, who has been the general purchasing agent for the American Road Machinery Co., Kennett Square, Pa., has resigned his position with that company to enter into the Government service. He expects to be commissioned as a lieutenant.

J. S. Gillespie, formerly shop superintendent for the National Forge & Tool Co., Erie, Pa., has been elected president of the American Hollow Boring Co., Erie, which has established a plant in that city.

Charles L. Wood, for some years assistant to William G. Clyde, now vice-president and general manager of sales of the Carnegie Steel Co., has been made assistant general manager of sales of the company in charge of the hoop and bar division, the place vacated by Mr. Clyde. Mr. Wood was born in Youngstown, Ohio, and attended the Ohio State University at Columbus, taking a course in mining engineering. His connection with the steel business began in 1898 with the American Steel Hoop Co., Pittsburgh, at which time he was placed in charge of its order department in New York. After the American Steel Hoop Co. was taken over by the Carnegie Steel Co., he was transferred to the sales department of the Carnegie company in Pittsburgh. His knowledge of the bar and hoop trades made him the logical assistant to Mr. Clyde, a position which he filled with credit and resulted in his promotion. Mr. Wood has a wide acquaintance among the manufacturers and users of bar and hoop products.

CHARLES L. WOOD

E. L. Maddox, formerly a manufacturer of chairs at Grand Rapids, Mich., and the past four years a resident of Sacramento, has been appointed manager of the Liberty Iron Works, Sacramento, Cal., to succeed John L. Jordan. The Liberty plant is building airplanes.

A. L. Wurster, eastern representative of the Heppenstall Forge & Knife Co., Pittsburgh, is in the hospital recuperating from an operation he underwent on March 22.

E. G. Howell, who has been with the Chicago sales office of the Republic Iron & Steel Co. for the past 13 years, has associated himself with Briggs & Turivas, Inc., operators in iron and steel scrap, Westminster Building, Chicago.

Fred H. Cozzens, formerly manager of export sales of the Four Wheel Drive Automobile Co., Clintonville, Wis., has resigned to become vice-president and general sales manager of the Topp-Stewart Tractor Co..

Clintonville, which recently completed its plant and expects to be on a regular production of farm tractors by May 1.

Herbert Longstaff has been appointed manager of the St. Louis office in the Boatman's Bank Building of the Asbestos Protected Metal Co., Pittsburgh.

W. O. Duntley has resigned from the presidency of the Chicago Pneumatic Tool Co., Chicago, after 22 years' service. He will devote his time hereafter to his private affairs, but will continue as a director and member of the executive committee of the company. He will be succeeded as president by Jacob L. Price.

Charles P. Neill, of Washington, former United States Commissioner of Labor, has been made chief of the Industrial Service Section, Ordnance Division, War Department, with W. Jett Lauck, former statistician of the Industrial Relations Commission, as his assistant.

M. O. Cederquist, of the staff of Perin & Marshall, consulting engineers, New York, has returned from England, where he has been supervising the installation of two 600-ton Greenawalt sintering plants, one for treating blue billy and the other Dunderland concentrates.

E. P. Thompson, who has specialized in vegetable oil-making plants, has arrived in New York from India to purchase machinery for five or six cottonseed oil plants for the Tata interests, involving upward of $10,000,000. His headquarters are with Perin & Marshall, 2 Rector Street.

K. E. Humbert left New York on April 1 for Japan, China, Singapore and India by way of Vancouver. For Perin & Marshall, consulting engineers, New York, he will supervise the erection at Bombay, India, of an electric steel plant of 4000-kw. to 5000-kw. electric capacity.

Annual Meeting of United States Chamber of Commerce

WASHINGTON, April 2.—Representatives of more than 1000 commercial organizations, with a combined membership in excess of 500,000 business executives, will gather in Chicago on April 10 for the sixth annual meeting of the United States Chamber of Commerce, the chief business of which will be to plan the further part business is to play the second year of the war.

There will be four chief objective points: (a) Financing the war, (b) railroads and highway transportation, (c) ships and shipping, and (d) organized control of industry. Prominent among those who will deliver addresses are The Earl of Reading, British Ambassador; Secretary of the Navy Daniels, Secretary of the Interior Lane, Edward N. Hurley, chairman of the Shipping Board; Alba B. Johnson, president of the Baldwin Locomotive Works; Edwin Carry, director of operations, U. S. Shipping Board; John F. Wallace, chairman of the Chicago Terminal Commission; Roy D. Chapin, president of the Hudson Motor Car Co., and chairman of the Highway Transport Committee of the Council of National Defense; Theodore N. Vail, president of the American Telephone & Telegraph Co., and Charles A. Hinsch, president of the American Bankers' Association, and others of equal standing and authority.

At the annual meeting of the shareholders of the Nova Scotia Steel & Coal Co., New Glasgow, N. S., the number of the board was increased to sixteen, and there was one vacancy to fill through the death of James D. MacGregor, vice-president and charter member of the directorate. That vacancy was filled by the appointment of Robert M. MacGregor, only son of the deceased, while the two newly created positions were filled by the appointment of D. C. Jackling, New York, and W. Hinkley Smith of Philadelphia. All the other members were re-elected with the exception of A. S. Reidall of St. John's, Newfoundland.

Foreign Trade Convention at Cincinnati April 18-20

The fifth convention of the National Foreign Trade Council will be held in Cincinnati, April 18, 19 and 20. The Gibson Hotel has been selected as headquarters, but a number of business sessions of different committees will be held at the Sinton Hotel. The convention was originally scheduled to be held in February, but the railroad congestion at that time caused a postponement.

The main theme of the convention will be "The Part of Foreign Trade in Winning the War." James A. Farrell, president of the United States Steel Corporation, who is chairman of the National Foreign Trade Council, will open the first general session at 10 a. m., April 18. The address of welcome will be delivered by Mayor John Galvin, followed by the election of a convention president and the delivery of the president's address. The remainder of Thursday morning will be taken up with reports of "war contributions of various factors in foreign trade." Metals will be represented by E. A. S. Clarke, president Lackawanna Steel Co.; oil by A. C. Bedford, president Standard Oil Co., and other members will report for textiles, lumber, chemicals, finance, agriculture and coal.

Thursday afternoon will be a second period of general discussion in which trade encouragement agencies of the United States and foreign governments will be compared by Burwell S. Cutler, chief of Bureau of Foreign and Domestic Commerce. Exports and imports control will be discussed by C. A. Richards and others. Four group meetings will be held Thursday afternoon, dealing respectively with co-operation in foreign trade, commercial education, banking facilities and initiatory problems. George H. Charls, American Rolling Mill Co., Middletown, Ohio, will speak in the group meeting, dealing with co-operation on "Organization of an Export Association Under the Webb Bill." Friday morning's general session will be devoted to the American merchant marine, the list of speakers including M. A. Oudin, General Electric Co., and F. W. Taussig, chairman of the U. S. Tariff Commission. Group meetings will be held Friday afternoon. On Saturday morning at the closing general session reports will be made embodying recommendations of the group meetings.

The banquet will be held at the Gibson Hotel at 7 o'clock, April 19. The toastmaster will be L. A. Ault of Cincinnati, who will introduce as speakers Hon. James M. Cox, Governor of Ohio; E. N. Hurley, chairman United States Shipping Board, and James A. Farrell.

O. K. Davis, secretary of the National Foreign Trade Council, 1 Hanover Square, New York, has sent out an appeal to those who expect to attend, urging them to register in advance. Robert S. Alter, vice-president and export manager American Tool Works Co., Cincinnati, who is chairman of the committee on arrangements announces that everything is in readiness for the convention, but he advises all who expect to attend to send their acceptances for the banquet at as early a date as is possible.

Inspectors Urgently Needed

The branch office of the Inspection Division, Ordnance Department, 600 West Jackson Boulevard, Chicago, has immediate need for 250 to 300 inspectors. Positions pay $3.50 to $5 for an 8-hr. day and time and one-half overtime. Female applicants between the ages of 21 and 50, and male applicants between the ages of 31 and 50 will be considered. Men are especially needed who have had artillery ammunition, carriage, motor, small arms or small arms ammunition experience. Applicants are requested to report to Mr. Becker, 600 West Jackson Boulevard, Chicago, for interview and application blank.

The Columbia, Pa., tube mill of the A. M. Byers Co., which has been idle for a few months because of lack of fuel and freight congestion, resumed Monday, April 1.

Speeding Up the Mobilization of Labor

Prompt Action on Housing for Munitions Workers — Labor Conference Agreement—Penalty for Enticing Workmen

WASHINGTON, April 2.—There has been a notable speeding up during the past week in the work of mobilizing labor for the more energetic prosecution of the war. High officials of the Government have made vigorous representations to those directly in charge of the work of organizing labor and already results are in evidence, including an agreement of the National Labor Conference upon a declaration of principles governing the relation of employers and employees during the war; a decision on the part of the congressional leaders to give immediate consideration to the bill appropriating $50,000,000 for the housing of workers at munition plants, and the introduction in the Senate of a measure designed to put an end to the practice of certain manufacturers of obtaining workmen by enticing them from the plants of competitors, by requiring that all Government contractors shall procure any necessary additions to their working forces exclusively through the agency of the United States Employment Service of the Department of Labor. The necessity for prompt action on these and other measures has been further emphasized within the past 48 hours by official reports of strikes and threats of strikes, not only in private plants, but in such Government establishments as the Hampton Roads Naval Base, the Pig Point Ordnance Depot and the Army Depot Base at Bush Bluff, Va.

Labor Conference Agreement

The National Labor Conference, after more than a month of deliberations, last Saturday reached an agreement on a declaration of principles which provides that there shall be no strikes or lockouts during the war, that all industrial disputes shall be settled by a Government mediation body, that both union and open shops shall continue as such, that the basic day shall be eight hours with increased pay for overtime, and that women doing men's work shall receive equal compensation. The official summary of the agreement is as follows:

There should be no strikes or lockouts during the war.

The right of workers to organize in trade unions and to bargain collectively, through chosen representatives, is recognized and affirmed.

The right of employers to organize in associations of groups and to bargain collectively, through chosen representatives, is recognized and affirmed.

Employers should not discharge workers for membership in trade unions, nor for legitimate trade union activities.

The workers, in the exercise of their right to organize, shall not use coercive measures to induce persons to join their organizations, nor to induce employers to bargain or deal therewith.

In establishments where the union shop exists the same shall continue and the union standards as to wages, hours of labor and other conditions of employment shall be maintained.

In establishments where union and non-union men and women now work together, and the employer meets only with employees or representatives engaged in said establishments, the continuance of such conditions shall not be deemed a grievance.

If it shall become necessary to employ women on work ordinarily performed by men, they must be allowed equal pay for equal work and must not be allotted tasks disproportionate to their strength.

The basic eight-hour day is recognized as applying in all cases in which existing law requires it. In other cases the question of hours of labor shall be settled with due regard to governmental necessities and the welfare, health and proper comfort of the workers.

The maximum production of all war industries should be maintained.

The right of all workers, including common laborers, to a living wage is hereby declared.

In fixing wages, minimum rates of pay shall be established which will insure the subsistence of the worker and his family in health and reasonable comfort.

The functions and powers of the Federal mediation agency, which is to be known as the National War Labor Board, are set forth as follows:

To bring about a settlement, by mediation and conciliation, of every controversy arising between employers and workers in the field of production necessary for the effective conduct of the war.

To do the same thing in similar controversies in other fields of national activity.

To provide for selection of committees or boards to sit in various parts of the country where controversies arise, to secure settlement by local mediation and conciliation. As a last resort, an umpire appointed shall hear and finally decide the controversy.

The members of the board shall choose the umpire by unanimous vote. Failing such choice, the name of the umpire shall be drawn by lot from a list of ten persons to be nominated by the President of the United States.

The board shall meet in the city of Washington.

Housing at Munition Plants

The House was moved to give prompt consideration to the Clark bill providing housing at munition plants, which passed to-day. Reports from many sections were that manufacturers were having great difficulty in holding their organizations together in districts where living accommodations are hard to obtain. Amendments to the Clark bill have been adopted under which it will be discretionary with the Secretary of Labor to build either temporary or permanent housing, to sell permanent homes to workers desiring to purchase them and to salvage such projects as barracks, dormitories and cheap houses that it may be found desirable to build in the neighborhood of plants not likely to be operated after the war. The House committee also agreed to amend the bill so as to cut off absolutely the possibility of making contracts on the "percentage or cost-plus-percentage" basis. In this connection the plan of Director Eidlitz will be adopted, under which an estimate on each project will be carefully prepared at consultations between the officials of the housing bureau and leading contractors, and on this basis a flat fee for the compensation of the builder will be fixed. Thus, contractors will have no interest in any increase in the cost of the work that may result from uncontrollable conditions, but will have an important incentive to complete the work at the earliest possible moment in order to minimize overhead cost and secure an early payment of fees.

Arrangements have been made with the Senate leaders to take up the housing bill as soon as it is received from the House. The Senate committee has already considered the measure informally and will be ready to report it without delay.

To Stop Bidding for Workmen

The bill designed to put an end to competition among manufacturers for workers on Government contracts is admitted to be an extraordinary departure and it is probable that its consideration will result in protracted debate in both houses. The absolute elimination of competition for labor among Government contractors is so novel and would have such far-reaching consequences, if rigorously enforced, that labor representatives in Congress may be expected to demand its careful examination if not its rejection. The measure, which has been introduced by Senator King of Utah, was referred to the Senate Committee on Education and Labor. It provides that hereafter every contract entered into by any executive department or other Government agency or branch of the public service on behalf of the United States which may require the employment of laborers or mechanics shall contain a pro-

vision that all such laborers and mechanics shall be procured through the agency of the United States Employment Service of the Department of Labor, under such rules and regulations as the Director of Employment, with the approval of the Secretary of Labor, may prescribe; and every such contract shall stipulate a penalty of $50 for each laborer or mechanic procured otherwise.

It will be generally conceded that the practicability of enforcing such a measure without producing confusion and hardship and general demoralization would depend upon the character of the rules and regulations to be approved by the Secretary of Labor. While admitting the great desirability of bringing to an end the practice of enticing competitors' workmen, manufacturers here who have examined the King bill suggest that it should be carefully safeguarded and rendered sufficiently flexible to meet practical conditions of employment. Provision should be made, it is said, for the re-employment of discharged workers without resorting to the Federal agency, for the location of a large number of agents of the Department of Labor in the principal manufacturing centers so as to provide promptly for quick shifts of workmen out of employment, and for prompt rulings upon all charges involving technical violations of the proposed law.

It is probable that the King bill will be made the subject of hearings before the Senate committee when ample opportunity will be afforded for the presentation of suggested amendments. W. L. C.

Pittsburgh and Nearby Districts

The Carnegie Steel Co., Pittsburgh, is installing in its open hearth steel works at Farrell, Pa., a new sheet bar and a new billet mill to replace two present smaller mills which are being taken out. Some time ago the Carnegie Steel Co. added three more open hearth furnaces at the Farrell works, these giving more steel than the finishing mills could take care of, and the larger sheet bar and billet mills are being installed to take care of this surplus steel. The two mills were built by the Mackintosh-Hemphill Co., Pittsburgh. More cooling beds, hot beds, straightening rolls and soaking pits are also being installed to take care of the larger steel output. All the sheet bars made in this plant are shipped to the American Sheet & Tin Plate Co. and used at its Farrell works, which are nearby. The output of billets, which range in size from 1 in. x 1 in. and larger, are shipped to the Farrell works of the American Steel & Wire Co., just a short distance from the open-hearth plant, and are used in the manufacture by that company of wire rods. Reports that the Carnegie Steel Co. had placed orders for five additional finishing mills to be added to the McDonald (Ohio) works are untrue. The program for the McDonald plant originally called for nine hoop and bar mills, and this has not been changed. At present an 8-in. bar mill is operating, rolling rounds and squares, ¼ in to ⅝ in., concrete bars and hexagons of the same range; also flats 11/32 in. to 1½ in. wide by No. 12 gage to 7/16 in. thick. A 10-in. combination mill is nearly completed and will be the next mill at this plant to be started.

Press reports to the effect that the American Steel & Wire Co., Pittsburgh, would erect large wire rod, wire and wire nail mills at Dravosburg, Pa., are denied. It is stated that this concern has no plans under way at present for the building of new works in any location.

Reports that the H. C. Frick Coke Co., Pittsburgh, would grant its employees an advance of 15 per cent in wages, effective on April 15, are incorrect. The rumor arose from the announcement by the United States Steel Corporation of an advance of 15 per cent in wages of steel mill and other employees to become effective April 15. However, this advance of 15 per cent does not affect employees of any of the railroads, the mining and transportation or the shipbuilding companies controlled by the Steel Corporation.

The Keystone Bronze Co., Pittsburgh, will make a large addition to its brass foundry, and has taken out a permit for the erection of a new building 148 x 88 ft. The company will need some new foundry equipment.

INDUSTRIAL RAILWAYS

Regulations Promulgated by the Director General —Effect on Terminals

WASHINGTON, April 2.—Regulations concerning the construction, maintenance and operation of industrial railways or plant terminals, both old and new, have been prepared by the Director General of Railroads. The object of the director in promulgating these rules is to effect a separation of these terminal tracks from the trunk lines which serve them and to provide a clearly indicated line of demarkation between the two. The action taken is specially significant in view of the tariff of switching and spotting charges recently submitted by Mr. McAdoo to the State Railroad Commissions contemplating several hundred million dollars additional revenue for the roads to be paid by the leading industries of the country. The requirements to be observed are outlined as follows:

New Industry Tracks

1. As to new industry tracks:

(a) The industry shall pay for, own, and maintain that part of the track beyond the right of way of the railroad company.

(b) The railroad company shall pay for, own, and maintain that part of the track on the right of way from the switch point to the clearance point.

(c) Generally speaking, an industry shall pay for and maintain (although in special cases the railroad company may do so), and the railroad company shall own, that part of the track on the right of way from the clearance point to the right-of-way line.

(d) If the industry fails to maintain in reasonably safe condition the part of the track which it is required to maintain, the railroad company may disconnect the track or refuse to operate over it when not in such condition.

(e) The railroad company shall have the right to use the track when not to the detriment of the industry.

(f) The foregoing terms and conditions should be embodied in a written contract between the industry and the railroad company.

Existing Industry Tracks

2. Where existing industry tracks are not covered by written contracts, they shall be maintained and operated in accordance with the provisions stated in paragraph 1 hereof.

3. Where industry tracks are covered by written contracts, such contracts shall be adhered to until otherwise ordered; but where any such contracts appear to work inequalities or injustice, the circumstances should be brought to the attention of the regional director, who will report thereon to the Director General, if conditions seem to warrant.

4. The requirements of State statutes and of State commissions in respect of the construction, maintenance, and operation of industry tracks shall be complied with, but in cases where such compliance involves what appears to be an unreasonable burden upon the United States Railroad Administration, the circumstances should be brought to the attention of the regional director, who will report thereon to the Director General, if the conditions seem to warrant.

New Body to Eliminate Competition Among Government Departments

The creation of a Requirements Division at Washington which will establish priority of delivery in raw and manufactured war materials was announced April 2 by the War Industries Board. The division is calculated to eliminate competition among Government departments in obtaining supplies.

The new priorities agency will be headed by Alexander Legge. Other members already named are Judge E. B. Parker, priorities; George N. Peek, finished products; J. L. Replogle, steel; Director Gifford, Council of National Defense, and Col. George H. Estes, War Department.

Government agencies whose requirements will be coordinated by the division, include the Army and Navy, the Shipping Board, and the Railroad, Fuel, and Food Administrations.

Five hundred striking foundrymen at the plant of B. F. Avery & Sons, Louisville, have returned to work, the company having granted a flat wage increase of 20 per cent.

MIDVALE STEEL & ORDNANCE CO.

Large Increase in Earnings—Comments on War Conditions of Past Year

The annual report of the Midvale Steel & Ordnance Co. for the year ended Dec. 31 shows a decided strengthening of the company financially. The current assets increased from $76,985,915 in 1916 to $109,791,758 in 1917. In liabilities, the item "accruals and miscellaneous," which in 1916 was $3,880,035, is now described as "accruals and miscellaneous, including estimated Federal taxes," and amounts to $29,412,532. The net earnings from operations in 1917 amounted to $69,838,253 compared with $36,718,818 in 1916. There is a surplus balance of $41,461,560 compared with $32,214,724 in 1916. The report, which is signed jointly by William E. Corey, chairman, and E. C. Dinkey, president, says that, "while it is a source of gratification to know that in the great crisis through which our country is passing, your company is an important source of supply for munitions of war, it is proper to state that materials used exclusively for war purposes, *i. e.*, armor, ordnance, shells, etc., but not including ordinary commercial products such as are used in shipbuilding and rounds for shells, constituted only 12.83 per cent of the total business for the year 1917."

In regard to war conditions, the report says:

The year of 1917 has been notable, chiefly because of the recognition by the United States of a state of war with Germany and Austria-Hungary, and the consequences following this action. The steel trade, in particular, has been profoundly affected by conditions growing out of the war: first, by the Governmental policy of establishing prices; and second, by the war tax legislation, including excess profits tax and increased income taxes.

The action of the Government in establishing prices in September, 1917, has been a disturbing factor; not so much on account of the fact of regulation, but because most of the factors entering into the cost of manufacture have not been, and apparently cannot be, limited by the same authority.

Notwithstanding the difficulties of adjusting business to these new conditions, your company, in common with all of the steel companies of the country, has given its earnest and loyal support to the Government authorities in their endeavor to formulate a workable plan whereby a maximum output would be secured, together with fair prices to consumers of steel products.

The war taxes have had a marked influence on trade, especially during the latter part of the year. Business men generally have had to face the fact that, while their balance-sheets might show a highly profitable year, tax obligations could not be met with such assets as accounts of solvent customers, inventories, or property accounts. As an inevitable result, there has been and will continue to be a liquidation more or less drastic in order to convert these assets, so necessary to a going business, into cash, as the Federal taxes, due in June, 1918, must, of course, be paid in cash or equivalent Government securities. In order to accumulate the large cash reserves necessary to meet this obligation, which, in the National aggregate, is probably the largest payment due on one date in all human history, it has been necessary for the officers to conserve the cash resources of your company in every possible manner, even to the postponement of improvements and extensions, which under normal conditions would have been made.

In conclusion the report says, "Under existing conditions it would be futile to attempt to make any forecast of business conditions during 1918. The controlling factor will be the ability of the railroads to provide men and equipment to handle the raw materials to, and the finished material from, your works."

CONSOLIDATED BALANCE SHEET—DEC. 31, 1917

Assets

Property and plant (including property leased under 999-year lease from Cambria Iron Co. and improvements thereto)		$158,909,900.31
Investments in other companies		508,929.76
Total capital assets		$159,418,830.07
Current assets:		
Cash in banks and on hand	$18,833,078.22	
Customers' accounts	20,807,785.19	
Advance payments on ores purchased, etc.	4,342,081.50	
Bills and loans receivable	1,460,245.58	
Marketable securities at cost including U. S. certificates of indebtedness	27,590,196.30	
Inventories	36,758,371.34	
		109,791,758.13
Deferred charges: Advanced stripping ore mines, etc.		763,398.84
Sinking fund cash		125,328.88
		$270,099,315.92

Capital and Liabilities

Capital stock:		
Authorized	$150,000,000.00	
Unissued:		
Held for conversion of bonds. $24,727,500		
For general corporate purposes 25,272,500		
	50,000,000.00	
		$100,000,000.00
Capital stock of subsidiary companies not held by Midvale Steel & Ordnance Co. (par value)		2,033,450.00
Guaranteed stock: Cambria Iron Co. stock (see note below)		8,468,000.00
Bonded and mortgage indebtedness:		
Midvale Steel & Ordnance Co. 5 per cent convertible sinking fund gold bonds, due March 1, 1936:		
Authorized	$50,000,000.00	
Less:		
In treasury $1,508,000		
Redeemed during 1917 545,000		
Unissued 3,381,000		
	5,434,000.00	
	$44,566,000.00	
Subsidiary companies	13,342,000.00	
		57,908,000.00
Total capital liabilities		$168,409,450.00
Current liabilities:		
Vouchers audited and unpaid payrolls	$7,310,415.08	
Deposits received on contracts	477,739.65	
Accruals and miscellaneous, including estimated Federal taxes	29,412,532.44	
Bills and loans payable	393,124.28	
		37,593,811.45
Reserves:		
For depreciation and mine exhaustion	$14,200,319.09	
For contingencies and miscellaneous	4,512,723.58	
		18,713,042.67
Surplus applicable to minority stock interests, also premium and discount on capital liabilities, etc.		3,921,450.85
Surplus balance (after deducting Midvale Steel & Ordnance Co. dividends paid, $12,000,000)		41,461,560.95
		$270,099,315.92

Note: Cambria Steel Co. guarantees an annual dividend of 4 per cent on the above mentioned Cambria Iron Co. stock as rental for property held under the 999-year lease.

CONSOLIDATED STATEMENT OF INCOME FOR THE YEAR ENDED DEC. 31, 1917

Net earnings from operations (after deducting all expenses incident to operations including those for ordinary repairs and maintenance amounting to $13,836,596.88)		$69,838,253.73
Add: Other income, interest earned, etc.		1,567,522.22
		$71,405,775.95
Deduct: Other charges, interest paid, etc.		407,939.52
		$70,997,836.43
Provision for depreciation, exhaustion of minerals, etc.	$6,826,421.46	
Provision for prospective income and excess profits taxes	25,731,910.24	
		32,558,331.70
		$38,439,504.73
Deduct: Bond interest:		
Midvale Steel & Ordnance Co.	$2,244,733.50	
Subsidiary companies	279,493.07	
Guaranteed dividend on Cambria Iron Co. stock	338,720.00	
		2,862,946.57
Net income for the year 1917, after providing for minority stock profits		$35,576,558.16
Add: Surplus per certified accounts Dec. 31, 1916	$18,656,610.45	
Reserves set aside from profits for ore depletion prior to Dec. 31, 1916, over and above the amount allowed by the Government for income tax purposes now added back to surplus	131,826.52	
	$18,788,436.97	
Less: Amount transferred to appropriated surplus	903,434.18	
	$17,885,002.79	
Less: Dividends paid	12,000,000.00	
		5,885,002.79
Surplus balance, Dec. 31, 1917, carried to balance sheet		$41,461,560.95

IRON AND INDUSTRIAL STOCKS

Stocks Show Strength, But Market This Week Is Very Dull

While uncertainty still existed as to the result of the great battle in France, Wall Street last week continued to show remarkable firmness and stocks in many cases advanced. The stability of prices was, it is generally considered, proof of the fact that the stock market was pretty thoroughly liquidated last year. The market was extremely dull Monday of this week and Tuesday there was a desultory movement with reaction in some cases, and United States Steel preferred and common, Republic Iron & Steel and Bethlehem Steel, B, recorded fractional losses, while Midvale Steel, Colorado Fuel & Iron and Bethlehem Steel advanced slightly.

An interesting feature of the market last week was the heavy dealing in Liberty bonds. In one day, $23,000,000 of the second Liberty loan 4s were traded in, breaking all records of bond trading at the New York Stock Exchange. The Liberty loan issues displayed much strength following the announcement by Secretary McAdoo of the details of the third Liberty loan.

The range of prices on active iron and industrial stocks from Wednesday of last week to Wednesday of this week was as follows:

Allis-Chalm. com.	23¾ - 24½	Int. Har. Corp. pf.	100
Allis-Chalm. pf.	80 - 81	Lacka. Steel	76 - 77
Am. Can com.	46 - 47⅜	Lake Super. Corp.	14 - 14⅜
Am. Can pf.	90¾	Midvale Steel	44¼ - 45¼
Am. Car & Fdry. com.	75⅝ - 79⅝	Nat.-Acme	28¼ - 28½
Am. Car & Fdry. pf.	109½	Nat. En. & Stm. com.	47 - 48
Am. Loco. com.	61½ - 62½	N. Y. Air Brake	125
Am. Loco. pf.	99	Nova Scotia Steel	62
Am. Ship com.	95½ - 97	Pittsb. Steel pf.	90
Am. Ship pf.	84⅞	Pressed Steel com.	60
Am. Steel Fdries.	62½ - 63½	Pressed Steel pf.	95⅞
Bald. Loco. com.	73⅞ - 75⅝	Ry. Steel Spring com.	51¼ - 52¼
Beth. Steel com.	78¼ - 79½	Ry. Steel Spring pf.	96¼
Beth. Stl., Cl. B.	77 - 78½	Republic com.	78 - 79
Can. Car & Fdry. com.	90	Republic pf.	97 - 97½
Carbon Steel 2d pf.	65	Sloss com.	50
Cent. Fdry. com.	37¼ - 40	Superior Steel	35½ - 36
Cent. Fdry. pf.	48 - 49	Un. Alloy Steel	39 - 39¼
Chic. Pneu. Tool.	60¾ - 62½	U. S. Pipe pf.	42
Colo. Fuel	37 - 38	U. S. Steel com.	88⅞ - 90¾
Cruc. Steel com.	62 - 63⅝	U. S. Steel pf.	109 - 109⅝
Gen. Electric	136½ - 138⅝	Va. I. C. & Coke	66
Gt. No. Ore Cert.	26½ - 28⅜	Warwick	8⅝
Int. Har. of N. J. com.	115½ - 116¼	Westingh. Elec.	40¼ - 40¾
Int. Har. Corp. com.	53 - 56		

Cambria Steel Co. Report

Cambria Steel Co. has issued its report for the year ended Dec. 31, 1917, showing net income of $25,721,853 after all expenses and charges, including $17,264,396 provision for Federal taxes, as compared with $25,094,353 net income for 1916. Net income for 1917 was equal to 57.1 per cent on the $45,000,000 capital stock outstanding, against 55.7 per cent in 1916 and 14.2 per cent in 1915.

Income account of the Cambria Steel Co. for year ended Dec. 31, 1917, compares as follows:

	1917	1916	1915	1914
Net earnings	*$47,121,669	$27,511,794	$8,326,672	$3,115,932
Depreciat'n, etc.	3,996,700	1,821,103	1,251,524	637,837
Federal taxes	17,264,396	.....	.....	.....
Cambria Iron lease	338,720	506,336	671,610	517,105
Net inc.	$25,721,853	$25,094,353	$6,403,538	$1,960,990
Dividends	5,400,000	3,037,500	2,700,000	2,250,000
Surplus	$20,321,853	$22,056,853	$2,703,538	†$289,010

*Net earnings after deducting all expenses incident to operation of the properties, including those for ordinary repairs and maintenance, approximately $5,894,700 in 1917 and $4,818,300 in 1916.

†Deficit.

Gulf States Steel Output

Gross profits of the Gulf States Steel Co. were $4,199,925 for the year ended Dec. 31 last, compared with $2,452,510 for 1916. Total sales amounted to $11,763,476, an increase of $4,137,226. The balance after payment of preferred dividends was $2,666,936, equal to 32.7 per cent on $8,139,200 common stock, compared with 30.2 per cent earned in 1910. The amount reserved for taxes from last year's earnings was $1,000,000.

Shipments of steel by the company last year totalled 176,949 tons, compared with 155,147 tons in 1916. Of last year's deliveries 73,250 tons were sold to domestic consumers, while 103,699 went abroad.

Events of the year were the completion and operation of by-product coke ovens and the acquisition of additional coal reserves. The coking coal reserves at the end of the year were estimated at 11,000,000 tons and iron ore reserves amounted to 125,000,000 tons.

During the year the average number of men employed by the company was 2678, with an aggregate payroll of $3,013,802. In 1916 the average number of employees was 2369 and the labor expenditure $2,215,941.

Annual Meeting of Bethlehem Steel Corporation

Charles M. Schwab, chairman of the board of directors, after the annual meeting of the stockholders of the Bethlehem Steel Corporation in Newark, N. J., Tuesday, declared that the company's output "is showing a splendid improvement, as compared with the previous earlier months in the year, owing to the improvement in transportation facilities."

"Steel plants are now running at 80 per cent capacity, compared with only 50 per cent in January," said Mr. Schwab. "Our shipbuilding departments are running at 100 per cent capacity. Practically all our plants are working for the United States Government and the Allies."

E. G. Grace, president of the corporation, presided over the meeting, at the opening of which about 25 stockholders were present. Mr. Schwab did not address the stockholders. He told reporters that the bonus plan had stimulated production.

He said the bonus system was responsible for the unusual efforts of all employees of the plant to aid the Government. He declared that though transportation facilities were improving he could not say the same of labor. In 1917 $3,913,838.07, or 6 per cent of the total earnings, was paid in bonuses.

Four directors whose terms expired were re-elected and at a later meeting of the directors the officers were re-elected.

Dividends

The American LaFrance Fire Engine Co., Inc., 1¾ per cent on the preferred, payable April 1.

The Atlantic Steel Co., quarterly, 1½ per cent on the common, payable April 2.

The Babcock & Wilcox Co., quarterly, 2 per cent, payable April 1.

The Billings & Spencer Co., quarterly, 2 per cent and extra 2 per cent, payable April 1.

The Canadian Crocker-Wheeler Co., Ltd., quarterly, 1¾ per cent on the common and preferred, payable March 30.

The Carbon Steel Co., quarterly, 2 per cent and extra 2 per cent on the common, payable April 15.

The Chicago Pneumatic Tool Co., quarterly, 1½ per cent, payable April 25.

The Detroit Iron & Steel Co., quarterly, 2½ per cent and extra 2½ per cent on the common, and 1¾ per cent on the preferred, payable April 15.

The General Fireproofing Co. quarterly, 1¾ per cent on the common and preferred, payable April 1.

The Lukens Steel Co., quarterly, 1¾ per cent on the first and second preferred, payable April 15.

Manning, Maxwell & Moore, Inc., quarterly, 1½ per cent, payable March 30.

The Steel Co. of Canada, quarterly, 1½ per cent on the common and 1¾ per cent on the preferred, payable May 1.

The Transue & Williams Steel Forging Co., quarterly, $1.25, payable April 15.

The Superior Steel Co., quarterly, 1½ per cent on the common, payable May 1, and 2 per cent on the first and second preferred, payable May 15.

The United Alloy Steel Corporation, quarterly, $1, payable April 20.

The Westinghouse Electric & Mfg. Co., quarterly, 87½c., on the common, payable April 30, and 87½c. on the preferred, payable April 15.

The Wolcott Lathe Co., Jackson, Mich., has voted an increase in capital stock from $700,000 to $1,500,000. This company recently purchased a site adjoining its plant, and is planning the erection of additions.

Price Fixing Committee to Make No Changes

No Proposition for Hearing at Washington — Steel Committee Charged with Adjustments—The Pooling Plan

WASHINGTON, April 2.—That the statement published during the past week that the Price Fixing Committee of the War Industries Board has announced the decision of that committee to conduct hearings for the purpose of receiving requests, suggestions and complaints growing out of the Government approval of iron and steel maximum prices, is absolutely false is very emphatically declared by the chairman of the committee, Robert S. Brookings, through whom the announcement is alleged to have been made. In so far as there is the slightest basis for the published statement, it appears to be predicated upon a complete misunderstanding of a suggestion made by Judge Gary, on behalf of the Committee on Steel and Steel Products of the American Iron and Steel Institute, that his committee would be willing at any time to take up for consideration complaints of individual iron and steel producers of hardships resulting to them either from the basic prices as determined by the Price Fixing Committee, the differentials and extras as fixed by the committee of the Iron and Steel Institute, or other conditions that may arise in the industry from time to time. The work of the Price Fixing Committee of the War Industries Board, so far as it relates to the new schedule of iron and steel prices for the next 90 days, has been completed and there is no thought of modifying the schedule in any way before it expires on June 30.

No Hearings by Price Committee

"The assertion that I have made any announcement to the effect that the Price Fixing Committee will give hearings for the purpose of receiving suggestions and complaints concerning the schedule of iron and steel prices is absolutely untrue," said Chairman Brookings to the correspondent of THE IRON AGE, "and I am wholly at a loss to understand how such a statement could have been published when the facts are known to so many persons in the iron and steel trade. I have made no such announcement and the committee has decided upon no such course. I am glad to have an opportunity of correcting such an erroneous report.

"The schedule of basic prices fixed at our meeting on March 20 is intended to remain in force for 90 days without change. Before that period expires presumably it will be taken up for examination with a view to its further extension, with or without revision, in substantially the same manner heretofore pursued. The work of the Price Fixing Committee, so far as the current schedule is concerned, has been completed and no further hearings will be held. We have no plans whatever for taking the initiative with respect to any changes and there is no reason to believe that any will be made during the life of the schedule.

"I assume that this wholly erroneous report is based on a statement made at our recent conference, and possibly repeated elsewhere, that the committee of the Iron and Steel Institute will be prepared to receive and consider any complaints that may be made by manufacturers to the effect that they are having difficulty in operating under the present schedule, either because of the prices or on account of trade conditions. The institute's committee, it was stated, will investigate such complaints and every effort will be made by its members to obviate any discriminations or other hardships that may be found to exist. This work, however, will be done by the steel men themselves and not in any representative capacity so far as the Government is concerned. Our Price Fixing Committee, of course, would be willing at any time to confer informally with the institute's committee and that is one of the advantages of having a permanent price-fixing committee in existence, but such conferences as we would hold would not contemplate any changes in the present schedule during the 90 days covered by its recent extension.

Proposed Adjustment in Scrap

"As an illustration of what the steel committee of the institute proposes, I might cite the fact that at the recent meeting there was some reference to the difficulties which certain manufacturers have experienced in obtaining scrap because of their location with respect to the supply of that material. It is obvious that with a flat price on scrap certain consumers who are favorably located with respect to the supply, railroad facilities, etc., may at times have a very important advantage over their competitors, and unless some element of flexibility were introduced producers who are unfavorably situated would find themselves heavily discriminated against. After considerable discussion of this matter the members of the institute's committee promised to take it up in a liberal spirit and through the agency of the sub-committee on scrap seek to reach an adjustment whereby there would be an equitable distribution of this material among all consumers.

Steel Makers' Co-operation

"The spirit shown by the steel men in this matter was characteristic of their attitude throughout the dealings they have had with the War Trade Board. They have proved themselves to be big, broad men, who look beyond their own personal interests and who are considering the welfare of the entire industry and the best interests of the whole country. I am certain that such matters as that just mentioned can safely be left to their determination and that, so far as is at all practicable, any injustices or any inequalities that may develop will be corrected.

"The work of preparing differentials and extras will be left to the committee of the Iron and Steel Institute as heretofore and the Price Fixing Committee will not attempt to regulate those details. We have an important function that requires our close attention and necessitates the gathering of a large amount of data. The Federal Trade Commission has been supplying us with a vast amount of information which we must carefully digest in connection with what we know of the industries involved in the problems we are called upon to deal with. So far as iron and steel are concerned we are very glad to avail ourselves of the co-operation of the gentlemen forming the institute's committee and to rely upon them for working out minor details."

Special Prices on Semi-Finished Steel

Members of the Price Fixing Committee were very favorably impressed with the pledge given by Judge Gary to take care of small producers, particularly of plates, in the way of supplying steel at special prices. The suggestion that any such arrangements would infringe either the letter or the spirit of the anti-trust laws is scouted here, for it has been known for many

months that the Department of Justice will waive all technicalities relating to the Sherman and Clayton acts, provided the Government is designed to be the beneficiary and assuming, of course, that no direct injury results to private interests. It is conceivable that arrangements might be effected by certain interests ostensibly for the benefit of the Government that would operate to the serious disadvantage of other parties excluded from the combination, and of course the Attorney General does not intend to countenance such a proceeding. Good faith and the Government's interest will be the criteria in all cases, and where there is any doubt either as to the legality of any given policy or concerning the view that will be taken of it by the Government, the Department of Justice or the Federal Trade Commission will be prepared promptly to rule upon the project.

The Plan for Pooling Steel

In this connection the interesting fact develops that at the conference of the Price Fixing Committee with the steel men on March 20 there was some desultory discussion of the pooling plan originally proposed by Daniel Willard while serving as chairman of the War Trade Board. Mr. Willard had drawn the attention of the steel men to the fact that on the basis of prices made fairly remunerative to small producers in order to secure maximum output the big, fully integrated concerns secured unreasonably large profits. He, therefore, suggested that it might be practicable to pool the entire output of the industry, the Government paying each producer a reasonable profit and selling the total product at flat prices. At the conference on March 20 reference was made by members of the Price Fixing Committee to the pooling plan as in some respects ideal and the opinion was again expressed that the largest producers in the industry were obtaining profits not only greater than their small competitors but beyond the reasonable expectation of an American manufacturer in such a crisis as that now confronting the country. No serious attempt was made to urge the adoption of the pooling plan in the immediate future, however, and the project can not be said to have made any substantial progress as the result of the recent conference. It is conceded that it would take considerable time to work out a just basis for pooling the entire output of the iron and steel industry and a large organization would be necessary to administer the plan.

W. L. C.

Railroad Operations in Australia

The Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, D. C., has published a bulletin entitled, "Railway Materials, Equipment and Supplies in Australia and New Zealand," this being designated as Special Agents Series No. 156 and can be obtained at 25 cents a copy from the Superintendent of Documents, Government Printing Office, Washington, D. C., or from any of the district or cooperative offices of the Bureau of Foreign and Domestic Commerce. The bulletin, which was prepared by Commercial Agent Frank Rhea, says that of all the various lines of railway equipment and supplies in use in those countries, machinery and tools are first in volume of imports from the United States. Other supplies and equipment for the State railroads are purchased to some extent in this country, because in many respects railroad conditions in Australia and New Zealand are similar to those in the United States. To enable American manufacturers to make the most of opportunities in Australia and New Zealand, the Bureau's report goes exhaustively into all phases of railroad operation, a particularly interesting study in view of the fact that the roads are owned and operated by the Government. This is one of many reports being prepared by the Bureau to assist manufacturers of the United States to prepare for trade after the war.

GENERAL WAGE ADVANCE

Independent Companies and Steel Corporation Make Similar Announcements

Wages of many thousands of employees of the United States Steel Corporation and independent companies will be advanced 15 per cent April 15. The average daily wage of employees of the Steel Corporation, exclusive of the general administrative and selling force, has been as follows for the past four years:

1914	1915	1916	1917
2.88	2.92	3.29	4.10

This is the sixth advance granted by the Steel Corporation since the beginning of 1916, and makes an aggregate advance of 85 per cent.

Judge Gary's Statement

The following statement by Elbert H. Gary, chairman United States Steel Corporation, relative to increase of wages, has been issued:

"The Finance Committee of the United States Steel Corporation, after due consideration, has unanimously voted to increase the wage rates of day labor at the manufacturing plants about 15 per cent, to become effective April 15 proximo. The rates of other employees, except in cases where advancements have been made recently, will be equitably adjusted. Railroad companies, coal mining companies and shipbuilding companies are not included.

"It is rumored that some employers of labor have been discussing the adoption of an 8-hr. per day base, and in view of this fact we have given careful consideration to this question and have decided against it.

"Extending over a period of many years we have been operating on an 8-hr. basis in departments where the labor is unusually heavy and where the workmen and managers have both decided 8 hr. work was most conducive to health and comfort, and we have also been putting into practice from time to time during the last few years an 8-hr. day in most of our underground iron ore and coal mines. A little over 25 per cent of our total employees are on an 8-hr. basis.

"The conclusions arrived at to-day, as above stated, have been influenced, largely, by the reason that we believe the largest production will be thereby secured. This is always essential, and especially important in times like the present."

The Youngstown District

All the leading steel companies in the Youngstown, Ohio, district will give employees the same advance in wages, 15 per cent as announced by the United States Steel Corporation, and to go into effect Monday, April 15. The larger concerns are the Youngstown Sheet & Tube Co., Republic Iron & Steel Co. and Brier Hill Steel Co. Blast furnace and common labor in the Youngstown district, on and after April 15, will be on the basis of 38c. per hour, much the highest rate of wage ever paid common labor.

Effective April 16, all general labor at the Steelton, Pa., plant and other industrial mills owned by the Bethlehem Steel Corporation will be given an increase in wages of 15 per cent, President E. G. Grace announced.

Announcement has been made by representatives of the Building Trades Union in the Harrisburg, Pa., district that all skilled men are to receive a 15 per cent increase from their various employers who are large contractors. About 2500 are affected.

Making Browning Guns

On March 22 the New England Westinghouse Co., Chicopee Falls, Mass., began to assemble the first of the heavy type Browning machine guns from tools. The order was taken about five months ago and it was not expected that quantity output would start before June or July, but actual quantity production started April 1. It is reported that the plant is expected to make 30,000 of these guns during the remainder of 1918.

CORRESPONDENCE

Sulphur in Steel Castings

To the Editor: In your issue of March 21, 1918, you publish an editorial on "Sulphur in Steel Castings." This is a timely subject which now more than ever should be discussed down to a decisive conclusion.

We are sorry to admit it but years of contact with the steel castings industry have convinced us that thumb rule always did and still does prevail in this important branch of metallurgy. Specifications are never questioned and if a consumer asks for 0.02 per cent sulphur in castings, we go right ahead and spend fortunes on what may only be a whim on the part of an engineer, who never had been inside a steel foundry.

Copper-Bearing Pig Iron

A similar case appeared when our company was first approached to introduce the use of copper-bearing irons in the manufacture of converter steel castings. The late Mr. Tropenas made some experiments on the subject, and found that copper was not only far from detrimental to converter steel, but actually beneficial. Copper-bearing irons were then selling at a discount of about $6 per ton compared to copper-free irons and Mr. Tropenas further ventured the prophecy at the time, that the day would come when consumers would pay a premium for copper-bearing steels. Such premium has already been paid by certain railroad companies who insisted on copper in their rails and the strangest part of this is that a $2 per ton premium was paid for material which actually cost $6 per ton less to manufacture than the copper-free rail.

High-Sulphur Steels

We will be accused of generalizing, but we are strongly tempted to assert that the time will come when a premium will be paid for high-sulphur steels. At the present time such an assertion is only a desperate attempt to fight against the tide and the mass of specifications now in existence, all calling for low-sulphur steels, threaten to drown our feeble outcry. No less an authority than Dr. J. S. Unger (THE IRON AGE, Vol. 97, p. 146) has presented the case of high sulphur before a meeting of automobile engineers, but his powerful arguments were just like so much water running off a duck's back.

It might be well, at what we venture to call the turning point of the sulphur battle, to recall Dr. Unger's experiments on the subject. First, let us point out that Dr. Unger "experimented," as he calls it, on 100 tons of steel, which to-day represents a good average monthly output of an ordinary converter foundry. The experiment was really a slight departure from the usual practice, inasmuch as the only element tampered with was sulphur, which was caused to be present in quantities varying from 0.032 to 0.230 per cent. From these steels Dr. Unger produced channels, chain links, rivets, car axles and caused certain automobile manufacturers to drop forge crankshafts and sundry other parts for the purpose of ascertaining the hot working performance and welding properties.

The results of the experiment were staggering to our mind and probably to that of many others. "In rolling the channels, no tearing or red shortness was noticeable on the thin flanges of the higher sulphurs." In welding chain links "it was found that higher sulphurs welded perfectly and gave good results, but that lowering the welding temperature about 100 deg. C. prevented any cracking or crumbling of the steel in welding. In drop forgings, the high-sulphur steels stood severe hot work just as well as the lower sulphurs and when finished, careful inspection failed to reveal any difference between the high and low-sulphur steels.

Relation of Manganese to Sulphur

There appears, however, in Dr. Unger's paper, a small paragraph which seems to have been overlooked and which to our mind, represents the most important statement made by him. This is:

> The manganese of the three heats was 0.43, 0.62 and 0.67 per cent respectively (carbons 0.09, 0.32 and 0.51 per cent). Attention is called to this point, as large quantities of steel containing from 0.070 to 0.120 per cent sulphur and 0.75 to 1 per cent manganese are made regularly for consumers who must have a steel especially fitted for rapid drilling, turning or threading purposes. The comparatively high manganese in this screw or nut stock has an appreciable effect on the hot working properties. This was not the case in the *low manganese steels* (the italics are ours) studied in this investigation.

Now, what is the usual steel casting practice when it comes to correlating the sulphur and manganese contents?

Manganese is supposed to *mask* the effects of sulphur. Therefore, to a higher sulphur there always corresponds a high manganese in steel castings. In the light of Dr. Unger's investigation, it seems plausible to say that the higher the sulphur, the lower the manganese should be. When a casting is solidifying in a mold, it is being put through just as strenuous conditions as a forging under hot working, and this is usually translated, in our high-sulphur high-manganese steel castings, into hot cracks.

Cast Steel Motor Trucks

Recently the writer visited a foundry in which a specialty was made of cast steel motor truck wheels. These wheels gave considerable trouble because of hot cracking and they never stopped cracking until the manganese was accidentally lowered in a heat which happened to be unusually high in sulphur. We understand that these wheels were machined and tested on a truck with good results, but the manufacturers were very dubious as to their being accepted, inasmuch as the sulphur specifications called for 0.05 per cent and their wheels contained 0.12 per cent.

It would seem then that we are traveling in a vicious circle. On the one hand Dr. Unger has shown in an experiment of the first magnitude that high-sulphur low-manganese steels work just the same as low-sulphur, low-manganese steels, with seemingly equal physical properties, and on the other hand, we scour the market for low-sulphur iron and coke to produce low-sulphur steels, and then we further squander our meager stock of ferromanganese to raise the manganese content and effect so-called "masking" of sulphur troubles. This is a strange world, and it appears that only a formidable shock such as the world war can rouse us from our lethargy of theorizing and pull us out of the rut.

We do not possess the means of undertaking an experiment of Dr. Unger's magnitude, but we believe that the United States Government might find it highly advantageous to replace some of the present manganese contents of steel by sulphur contents brought about by deliberate additions of sulphur. Cast-steel motor truck wheels might be a good thing to start with, and we would suggest sulphur contents of from 0.15 to 0.25 per cent, with manganese of 0.20 to 0.25 per cent, carbon 0.22 to 0.25 per cent and silicon about 0.30 per cent.

We fully agree with you when you say that "requirements introduced in specifications are often based on theory and not on practice, resulting in hardship and loss to the steel maker." That is why we abstained from theorizing in the above, but we do not agree with you when you seemingly want to await the results of endurance tests in actual war service before changing present-day specifications. An experiment on a large scale recommends itself now, both from a standpoint of increased production and of conservation of our manganese supply. The quicker such an experiment is made the sooner the biggest bugaboo of the steel foundrymen's dreams will have been removed.

G. MUNTZ,
Vice-president and general manager,
Tropenas Converter Co.

Brooklyn, N. Y., March 26.

Machinery Markets and News of the Works

INQUIRY FOR SMALL LOTS

Few Large Lists of Tools During Week

Railroad List of 100 Tools Received by Chicago Trade—Another Inquiry for 300 Machines

The past week has been fairly active in all machine tool markets in the purchase of small lots of tools for Government work.

A few small lists have reached the New York trade, including one from the Watervliet Arsenal, Watervliet, N. Y., for additional equipment. The American Tobacco Co. wants a number of tools for a repair shop and the Standard Oil Co. has issued a list of six tools. The Southern Locomotive Valve Gear Co., Knoxville, Tenn., wants a number of new or second-hand tools.

New York dealers have received a notice of an advance in the price of precision lathes of 10 per cent, effective April 1, and a maker of hand screw machines announces a 15 per cent advance, effective April 15.

A railroad list has appeared in Chicago, the first in a long time. The Chicago, Burlington & Quincy Railroad requires about 100 tools. The Corn Products Refining Co., Argo, Ill., wants about 300 tools.

The Harroun Motors Corporation, Wayne, Mich., has received a large contract for shells and the necessary equipment is being bought.

The Standard Parts Co., Cleveland, placed an order for 35 or 40 machines for its American ball-bearing plant. The Adams Axle Co., Findlay, Ohio, is out with an inquiry for 20 36-in. lathes.

The Bilton Machine Tool Co., Bridgeport, Conn., is in the market for about 15 tools.

New York

NEW YORK, April 2.

The past week has been quiet so far as large inquiries are concerned, though there has been a fair volume of business in small lots of machine tools. The crane inquiry is exceedingly light.

A few small lists have reached the trade. The American Tobacco Co. is out with a small list for a repair shop. The Watervliet Arsenal, Watervliet, N. Y., is buying on a small list. The Federal Shipbuilding Co., New York, has asked for quotations on machine-shop equipment. The Standard Oil Co., New York, asks for quotations on two drill presses, one lathe, one shaper, one milling and drilling machine and one planer. The Southern Locomotive Valve Gear Co., Knoxville, Tenn., has sent a list to New York dealers covering the following equipment, new or second hand: Three planers, three shapers, one milling machine, three slotters, four steam hammers, five lathes, two boring mills, three drills, two radial and one upright, one universal grinder and one cutter grinder.

The Wright-Martin Aircraft Corporation, New Brunswick, N. J., did not place orders last week for the tools required for expansion of its facilities for making Hispano-Suiza aviation motors, but the trade is expecting the business to be placed at any time. Lancia & Co. have received bids on a large quantity of machine-tool equipment, and cable advices from Italy are being awaited before orders are placed. The John Thompson Press Co., New York, has bought the equipment recently inquired for to make trench mortar bombs. A number of small machine shops in New York and vicinity have received orders from the Ordnance Bureau, War Department, for gages, and orders for tools have been placed. The tools recently bought by the French High Commission are for ordnance and marine work, not aviation motors, as stated before.

The Tank Shipbuilding Corporation, a subsidiary of the Southern Oil & Transport Corporation, 120 Broadway, New York, will buy a small list of new equipment, including a steam hammer, for an extension of its shipyard at Newburgh, N. Y.

Precision lathes have been advanced 10 per cent by a few makers, effective April 1, and a manufacturer of hand screw machines has announced a 15 per cent advance, effective April 15. Higher labor costs are given in each instance as the reason for the advance.

The Braden Copper Co., 120 Broadway, New York, is receiving bids on a list of small cranes and hoists. The Thompson-Starrett Co., New York, has changed its inquiry for a 50-ton power house crane for the Government powder plant it is building to a 15-ton hand-power crane. Horace Staples & Co., New York, have bought two cranes for a brass plant they are constructing. The William Cramp & Sons Ship & Engine Building Co., Philadelphia, is getting bids on two long-span electric cranes.

The Carolina Shipbuilding Corporation, New York, recently incorporated in Delaware with a capital of $100,000, will construct yards at Charleston, S. C. A site has been selected and plans are being prepared for the proposed works, which will include an initial installation of three shipways. The company has received a contract for the construction of 12 all-steel freighters. Lorenzo Dilks, formerly president of Milliken Brothers, Milliken, Staten Island, is president. Eads Johnson, 115 Broadway, naval architect, is also interested.

The Armor Bronze Co., New York, has been incorporated with a capital of $100,000 to manufacture bronze products. F. D. W. Searing, N. Thompson and W. H. Jeffers, 128 Broadway, are the incorporators.

Charles P. Rogers & Co., New York, have been incorporated with a capital of $300,000 to manufacture metallic furniture. W. O. Rogers, Jr., M. R. Zabriskie and G. H. Burt, 140 West 119th Street, are the incorporators.

The New York Fulton Truck Co., New York, has been incorporated with a capital of $200,000 to manufacture motor trucks. H. A. Spector, 28 West Sixty-first Street, New York; C. A. Haniesen, 538 Dean Street, and J. G. Farquhar, 939 Newkirk Avenue, Brooklyn, are the incorporators.

The Du Bois Watch Case Co., 316 Herkimer Street, Brooklyn, has awarded a contract for the construction of a three-story brick addition, to cost about $18,000.

The Screwless Hinge Corporation, New York, has been incorporated with a capital of $150,000 to manufacture hinges, etc. F. H. Butehorn, 764 St. Johns Place, and H. B. Holland, 108 Prospect Place, Brooklyn; A. E. Moore, 37 Wall Street, New York, are the incorporators.

The Fulton Steel Corporation, 165 Broadway, New York, has increased its capital to $140,000.

The De Waray Aero Corporation, New York, has been incorporated with a capital of $10,000 to manufacture airplanes. J. O. Trybom, W. L. Rathborne and L. Langville, 251 East Fourth Street, are the incorporators.

The Johnson Shipbuilding, Repair & Dry Dock Co., Brooklyn, has been incorporated with a capital of $100,000. M. Brown, H. Zasloff and G. Johnson, 248 Clinton Street, Brooklyn, are the incorporators.

The Keiner-Williams Stamping Co., 652 Vine Street, Richmond Hill, L. I., manufacturer of milk cans, tanks, etc., has acquired property at Jamaica Avenue and 123d Street for extensions.

The Morgan Auto Alarm Corporation, New York, has been incorporated with a capital of $150,000 to manufacture automobile alarms, engines and appliances. W. J. McKenna, Jr., J. C. Dodson and W. S. Smith, 47 West Thirty-fourth Street, are the incorporators.

The Storey Rubber Corporation, Hempstead, L. I., has been incorporated with a capital of $625,000 to manufacture automobile tubes and rubber goods. E. O. Storey and R. Jenkins, Hempstead; and E. G. Storey, Bayside, L. I., are the incorporators.

The Liberty Lighting Supply Co., New York, has been incorporated with a capital of $5,000 to manufacture lighting

fixtures. M. P. Hartman, A. Weiss and H. Hoffman, 2270 Seventh Avenue, are the incorporators.

The Lord Construction Co., 105 West Fortieth Street, New York, is planning for the establishment of new engine works at Fields Point, Narragansett Bay, near Providence, R. I.

The Maritime Engineering Corporation, New York, recently incorporated with a capital of $1,250,000, has acquired a site on Goat Island, Elizabeth City, N. C., on the Pasquotank River, for a new shipbuilding works. It plans for the immediate construction of a number of shipways, shops and other structures to build steel vessels. Russell B. Smith, 50 East Forty-second Street, New York, is president.

The Kingsley Motor Sleigh Co., Inc., Troy, N. Y., has been incorporated with a capital of $25,000 to manufacture motor equipment. A. S. Kingsley, 498 Park Place. J. J. Seaquat, 402 Third Avenue, Troy; and P. J. Kingsley, 138 Ontario Street, Cohoes, are the incorporators.

The Havens Electric Co., Albany, N. Y., manufacturer of electrical supplies, has increased its capital from $25,000 to $100,000.

The Wright-Lawes Motor Corporation, Albany, N. Y., has been incorporated with a capital of $30,000 to manufacture motor trucks. F. A. Wright, C. A. E. Lawes, 253 Central Avenue, and G. A. Hibbard, 16 Sheridan Avenue, Albany, are the incorporators.

The Ceilite Co., Utica, N. Y., has been incorporated with a capital of $100,000 to manufacture gas and electric fixtures. W. L. Foley, W. I. Taber and S. Garfunkel, Utica, are the incorporators.

The Alsen Portland Cement Co., Alsen, N. Y., has been reorganized by A. Mitchell Palmer, alien property custodian, taking over the stock of the company, which has a capital of $2,400,000. George R. Walker has become president. W. H. Maxwell and Richard Swartwout are directors.

The Niles-Bement-Pond Co., 111 Broadway, New York, with works at Plainfield, N. J., manufacturer of machine tools, is having plans prepared for its proposed new plant on the Lincoln Highway and the Hackensack River, Kearny, N. J. The initial works will consist of one and two-story buildings, comprising machine shops, erecting works and other structures, and, it is said, will cost about $2,000,000. It will specialize in the manufacture of industrial locomotives and heavy machinery. Harris & Richards, Drexel Building, Philadelphia, are the architects.

The Eastern Steel, Iron & Foundry Co., Jamesburg, N. J., recently organized, has purchased the plant of the B. Z. Tool Co., Jamesburg, which has been closed since last fall. The new owner will remodel the present foundry, which is 65 x 125 ft., and plans for the immediate erection of a 60-ft. addition. The works will specialize in the manufacture of fine castings and piano plates. Henry Bolte, formerly connected with the Matawan Steel & Iron Co., Matawan, N. J., is president.

The L. W. Ward Co., Paterson, N. J., has been incorporated with a capital of $50,000 to manufacture automobiles and parts. L. Wittingham Ward, James McGold and Roy M. Suttliff, Paterson, are the incorporators.

The California Shell Loading Co., New York, recently organized, is reported to be negotiating for property at Runyon, N. J., near Perth Amboy, for a new plant for shell production exclusively. Officials of the Oliver Shell Loading Co., Runyon, are said to be interested.

The Brady Brass Co., 170 Fourteenth Street, Jersey City, N. J., manufacturer of brass and bronze castings, has acquired 50 x 100 ft. on Henderson Street for extensions.

Fire, March 26, destroyed a portion of the repair shops of the Erie Railroad Co., Jersey City, N. J., with loss, including equipment, of about $200,000.

The Hoboken Manufacturers Railroad Co., Hoboken, N. J., has acquired a new plant, 100 x 250 ft., and adjacent property, at the foot of Twelfth Street, for about $855,000.

Adolph Saur, Inc., West Hoboken, N. J., has been incorporated with a capital of $200,000 to manufacture machinery. Frederick Brunner, William B. Greeley and Ambrose L. O'Shea are the incorporators.

The Pipe & Tube Bending Corporation of America, Newark, N. J., has been incorporated with a capital of $400,000 to manufacture pipe, tubing, etc. William Schmidt, Newark; Herman H. Kistner, Elizabeth and William S. Weiss, New York, are the incorporators. Headquarters will be established at 577 South Tenth Street.

The Standard Products Co., Newark, has been incorporated with a capital of $50,000 to manufacture automobiles and parts. Saul Wiener and Jacques Manheim are the incorporators.

The Perfection Tool & Machine Co., Newark, has been incorporated with a capital of $50,000 to manufacture tools and machinery. Emil Hurliman and Nathaniel Turok, Elizabeth, are the incorporators.

The Acme Foundry Co., Newark, has leased the new one-story foundry building, 30 x 95 ft., to be erected by Max Mendl at 60 Elm Street.

The Clydesdale Motor Truck Co., Newark, has been incorporated with a capital of $125,000 to manufacture motor trucks. B. C. McKenna, J. J. Tully and S. A. Farrell, Newark, are the incorporators.

The Hay Foundry & Iron Works, Plum Point Lane, Newark, is having plans prepared for a new one-story, brick and steel foundry, 50 x 250 ft.

The Liberty Machine Tool & Die Co., formerly the Newark Machine & Engineering Co., 692 South Eleventh Street, Newark, is having plans drawn for a factory to contain from 15,000 to 20,000 sq. ft. of floor space, for which it will break ground in a short time. The company is engaged exclusively in Government work and will invest from $50,000 to $100,000 for additional machinery, if satisfactory arrangements can be made. Albert W. Wenzel, ex-president of the American Piston Ring Co., is the president of the new company.

The Menten Brass Co., Inc., Brooklyn, has been incorporated with a capital of $25,000 to manufacture brass goods. B. E. and A. J. Menten, Bayside, L. I., and R. Weller, 1547 Broadway, N. Y., are the incorporators.

The Cell Beam Co., New York, has been incorporated with a nominal capital of $5,000 to manufacture lighting fixtures. R. W. Wadman, J. Record and N. G. Rost, 518 West Ninety-eighth Street, are the incorporators.

Fire, March 20, destroyed a portion of the piano works of Horace Waters & Co., 323-5 East Fortieth Street, New York, with loss estimated at $60,000.

The Cantopen Lock Co., New York, has been incorporated with a capital of $25,000 to manufacture locks. J. Schwoerer, G. Rammann and F. A. Hagels, 22 Irving Place, are the incorporators.

The J. & D. Tire Co., New York, has been incorporated in Delaware with a capital of $1,000,000 to manufacture tires and other rubber goods. Thomas F. Thornton, New York; Rudolph Delesser, Great Neck, L. I.; and William F. Smith, Cynwyd, Pa., are the incorporators.

The Duke Steel Co., New York, has been incorporated with a capital of $15,000 to manufacture steel products. W. B. Dukeshire, E. R. Mead and W. B. Banker, 30 Church Street, are the incorporators.

Catalogs Wanted

Victor R. Browning & Co., manufacturers of hoisting and conveying machinery, College Point, N. Y., who are manufacturing 5-in. gun mounts for the Navy Department, desires catalogs of materials and equipment used for this class of work. C. R. Rudinger is purchasing agent.

Buffalo

BUFFALO, April 1.

The Aldrich Mfg. Co., Illinois Street and the Lackawanna Railroad, Buffalo, has been incorporated with a capitalization of $400,000 to manufacture copper and brass utensils and other metal products, and will take over the existing business and plant of the unincorporated company of the same name. The new capital will be used in the expansion of its business.

The Buffalo Contractors Plant Corporation, 129 Erie Street, Buffalo, is arranging for the equipment of the factory recently purchased on Erie Street for the manufacture of hoisting and other machinery and appliances.

Contract has been let for a four-story reinforced concrete and steel factory to be erected on Clinton Avenue, Rochester, by the Wollensak Optical Co., to cost $100,000.

The Delaney Forge & Iron Co., 300 Perry Street, Buffalo, manufacturer of steel and iron forgings, will erect a new one-story machine shop and factory.

The Power Efficiency Corporation, 102 Clinton Street, Buffalo, manufacturer of power plant specialties, with foundry on Broadway, has increased its capital from $100,000 to $350,000.

The Liberty Aircraft Corporation, Buffalo, recently incorporated with a capital of $1,000,000, has acquired a factory at North Tonawanda for its proposed new works. It will specialize in the manufacture of a new metal, bullet-proof, flying tank, with folding wings, having a total weight of about 500 lb. Plans are also being considered for the establishment of a plant at Buffalo. George P. Weidman, Tonawanda, is president, and Edward L. Weidman, vice-president.

The Hession Tiller & Tractor Co., Buffalo, is planning to remodel the plant of the Chase & Baker Co. on East Jewett Avenue, recently acquired, for the manufacture of motor tractors.

The Brown Car Wheel Works, Inc., Buffalo, is reported to be contemplating the enlargement of its plant on Howard

Street. It recently filed articles of incorporation with a capital of $500,000.

The recent incorporation of the iron and steel concern of the Mayer & Clarkson Co., 453 Ellicott Square, Buffalo, with a capitalization of $50,000, was to increase its financial strength, to extend its operations and to establish a local steel warehouse in which it will carry a complete line of iron, steel, brass, copper and mill supplies. It also plans to manufacture a patented ratchet wrench.

The Ames Iron Works, Oswego, N. Y., manufacturer of engines and boilers, has awarded a contract for the erection of an addition to its foundry, 50 x 200 ft., to cost $35,000.

The Groton Electric Power Corporation, Groton, N. Y., is planning for the construction of a new power plant at Freeville.

The Rochester Can Co., 295 West Avenue, Rochester, N. Y., sheet-metal worker, has increased its capital from $125,000 to $500,000.

The Bignall Co., 621-3 Main Street, Medina, N. Y., manufacturer of cast-iron sinks, fittings, etc., has increased its capital from $30,000 to $75,000.

New England

BOSTON, April 1.

Machine tools builders, as a rule, report the last week as being unusually quiet. The result is that plants are catching up on deliveries and are better able to take care of orders from industries not directly connected with the war program. Machine-tool dealers report a busy week, with a notable increase in orders and inquiries from smaller plants. The business is apparently about evenly divided between machines for manufacturing purposes and those for tool and gage making.

The Bilton Machine Tool Co., Bridgeport, Conn., is in the market for about 15 machines. The General Electric Co. has increased its purchases of equipment for the West Lynn works. The various plants are still picking up machines here and there, but the volume of business is comparatively small, as most of its needs were covered some time ago.

The Hamilton Abrasive Co., Westfield, Mass., has awarded a contract for a complete plant, consisting of two one-story buildings, 40 x 200 ft., and 40 x 80 ft., and one one-story building, 32 x 50 ft.

The Providence Fittings Co., Providence, R. I., has been incorporated with authorized capital stock of $100,000 to manufacture pipe fittings. The incorporators are Philip C. Joslin, Alfred G. Chaffee and Ira Marcus, all of Providence.

The Malleable Iron Fittings Co., Branford, Conn., is to build a pattern storage building, 61 x 121 ft., two stories, and a sand-blast building, 40 x 50 ft., one story. The removal of the pattern storage from a part of the steel foundry will enable the company to increase its output of steel castings. A part of the new pattern storage building will be used for an office for the foundry.

The Bangor Shipbuilding Co., Bangor, Me., has been incorporated with authorized capital stock of $200,000. Charles Murray is president and Victor Hodgkins, treasurer. It will build wooden vessels in the old Crosby yard.

Charles D. Stanford, George H. Hamlin, and others are organizing a shipbuilding company at Bangor, Me., to revive shipbuilding at the Stetson yard at Brewer, Me. Work on the first vessel will begin at once.

Thinking Machines, Inc., Cambridge, Mass., has been incorporated with authorized capital stock of $100,000 to manufacture mechanical devices. The incorporators are Arthur F. Blanchard, Cambridge; Everett S. Emery, Lexington, and William Morton, Reading.

The Waterbury Mfg. Co., Waterbury, Conn., suffered a loss of several thousand dollars by a fire in a storage room on the sixth floor of its new concrete building on North Main Street. Most of the damage was to machinery in storage.

The Beverly Tool & Machine Co., Beverly, Mass., has been incorporated with authorized capital stock of $24,000. The incorporators are Garry, Nicholas and Edgar Boniface.

The Bryce Brothers Mfg. Co., Forestville, Conn., which was busy on war orders for gun sights and ball bearings, lost its entire plant by fire, March 23. The building was a three-story structure into which the company had moved last August, leasing it to get larger quarters for its war work. It has not yet decided on future plans.

The Pratt & Cady Co., Hartford, Conn., has awarded a contract for a new boiler house and coal pocket, 30 x 103 ft.

The Marlin-Rockwell Corporation, New Haven, Conn., has secured a permit to erect an addition, 56 x 60 ft., two stories, at its plant on Willow Street.

The Connecticut Brass Mfg. Co., Waterbury, Conn., has awarded a contract for an addition, 56 x 60 ft., one story, to its plant in Cheshire, Conn.

Philadelphia

PHILADELPHIA, April 1.

James F. Burns, 713 Cherry Street, Philadelphia, manufacturer of electrical specialties, is planning for the construction of a five-story addition to his factory.

The Lenni Steel Co., 130 South Fifteenth Street, Philadelphia, has increased its capital from $1,500,000 to $2,000,000.

The Philadelphia Storage Battery Co., Ontario and C streets, Philadelphia, will build a one-story addition, 40 x 100 ft.

The General Machine & Supply Co., Philadelphia, has been incorporated with a capital of $25,000 to manufacture machinery, etc. William B. Goodall, Narbeth, Pa., is the principal incorporator.

The Interchangeable Grate Bar Co., Philadelphia, has increased its capital from $90,000 to $250,000.

The Bureau of Yards and Docks, Washington, D. C., will build a one-story, brick and concrete addition, 50 x 160 ft., to its aircraft plant at the League Island Navy Yard, Philadelphia.

The Philadelphia Boiler Works, 1737 Filbert Street, Philadelphia, has been incorporated with a capital of $50,000. William Hunter is treasurer.

A new one-story boiler shop to cost about $5,000 will be erected by the Quaker City Iron Works, Edgemont and Tioga streets, Philadelphia.

The Chicago Reedware Mfg. Co., Philadelphia, has been incorporated in Delaware with a capital of $100,000 to manufacture iron, wire and reed furniture. F. H. Hansell, Philadelphia, and S. C. Seymour, Camden, N. J., are the incorporators.

A new one-story, brick and concrete factory, 52 x 70 ft., will be erected by the Cunningham Piano Co., Philadelphia, at Forty-ninth Street and Parkside Avenue.

A new two-story boiler plant will be erected by the city of Trenton at the Municipal Hospital. The structure will be about 26 x 300 ft., and, including a new laundry plant, will cost $85,000.

The New York Shipbuilding Co., Camden, N. J., is building extensions to its works to double the former capacity. New shipways extending from Morgan Street to Newton Creek are now in course of erection, together with shop and other buildings.

The Measured Service Meter Co., Uniontown, Pa., has been incorporated with a capital of $50,000 to manufacture telephone and other meters. R. A. Neville is the principal incorporator.

The Montgomery Foundry & Pattern Co., Conshohocken, Pa., has been incorporated with a capital of $100,000 to manufacture castings, etc. C. C. Ohara, Norristown, is the principal incorporator.

The Parkesburg Iron Works, Parkesburg, Pa., will build a boiler house addition to cost about $18,000.

The Aldrich Pump Co., Bethlehem, Pa., is taking bids for the erection of a one-story addition, 40 x 150 ft.

The National Mfg. Co., Williamsport, Pa., has been incorporated with a capital of $50,000 to manufacture steel products. William C. McCormick is treasurer.

Van Alen & Co., Sunbury, Pa., operating nail manufacturing works, have resumed operations, following an enforced idleness of about two months, due to shortage of coal and materials.

The Peerless Foundry Co., Greensburg, Pa., has awarded a contract for the construction of one and two-story foundries and other buildings, 85 x 270 ft., 45 x 80 ft., and 30 x 80 ft., to cost about $150,000.

The Latrobe Die & Casting Co., Latrobe, Pa., has been incorporated with a capital of $50,000 to manufacture castings and other specialties. Joseph E. Barnett is the principal incorporator.

The American Radiator Co., Titusville, Pa., is building a new one-story foundry, about 80 x 100 ft., to cost $25,000.

The new plant of the Buchanan Foundry Co., Lebanon, Pa., to be located at Scranton, Pa., will be devoted to the production of weights for windows, elevators, etc., and allied specialties. It recently purchased two buildings and about two acres of property.

The Fretz Co., Philadelphia, has filed plans for the erection of a one and two-story engine and boiler house at Ontario and Brabant Streets to cost about $19,000.

The Metropolitan Edison Co., Reading, Pa., has made application to the Public Service Commission for permission to issue bonds for $525,000 for extensions and improvements in its electric plants and systems, etc.

Baltimore

BALTIMORE, April 1.

The McShane Bell Foundry Co., Harford Avenue and the Baltimore & Ohio Railroad, Baltimore, has increased its capital stock to 1500 shares of preferred of $100 par value and the same number of common without nominal or par value.

Fire, March 30, damaged the casting rooms and pattern shop of the Kennedy Foundry Co., Charles and Wells streets, Baltimore. A number of cranes and valuable patterns were also destroyed. The loss is estimated at about $200,000.

The Kennedy Foundry Co., Baltimore, has awarded a contract for the erection of a new one-story foundry at Charles and Wells streets to cost $15,000.

The Keystone Farm Machinery Co., Washington, D. C., has been incorporated in Delaware with a capital of $95,000. Wilmot W. Whitten and John E. Baker, Washington, are the incorporators.

The Automotive Tractor, Frederick, Md., recently incorporated with a capital of $150,000, has acquired property fronting on the Baltimore & Ohio Railroad and will establish a plant for the manufacture of farm tractors, with initial capacity of about 10 tractors per day. Machinery is now being purchased. Casper E. Cline is president.

The Powhatan Brass & Iron Works, Charleston, W. Va., will bulid a one-story foundry addition to cost about $20,000.

The Norfolk & Western Railroad Co., Norfolk, Va., is planning for extensions at its shops and yards at North Bristol, Va., to cost $300,000.

Harry P. Hite, Huntington, W. Va., is planning for the construction of a new one-story machine shop, 50 x 200 ft., at Twentieth Street and Second Avenue.

The Woodstock Operating Corporation, Anniston, Ala., is planning to rebuild its machine shop and forge works, recently destroyed by fire.

Cincinnati

CINCINNATI, April 1.

The Government demand for auto-trucks is very heavy and is taxing the capacity of some plants in this section. Orders from private firms are also increasing. Recently several trucking express lines have been established in Cincinnati, Dayton and Columbus, to transport freight to nearby points, and from this source alone there is an active demand for large sized auto-trucks.

Machine-tool builders are receiving urgent orders for large machines, such as boring and turning mills, planing and drilling machines, but the smaller machines are not needed. These orders are either from the Government direct, or from firms having war contracts. Automobile manufacturers, as well as railroad car makers, are buying very few machine tools, with the exception of those companies engaged in war work.

The problem of housing labor is a serious one in a few nearby manufacturing centers, but is not causing any concern in this city. Steps have been taken at both Hamilton and Dayton, Ohio, to erect suitable homes for workmen without delay.

The Mosler Lock Co., Cincinnati, has been incorporated with $150,000 capital stock by William Mosler, Cincinnati, and Moses Mosler, Hamilton, Ohio. Details of the company's plans have not been given out, but it is reported that a plant will be established in Cincinnati to be devoted mainly to the manufacture of munitions.

The Cincinnati Shaper Co., Cincinnati, will build an addition to its plant in the Camp Washington district that will be used principally for storage purposes. P. G. March is president.

The Steubing Automatic Machine Co., Cincinnati, has increased its capital stock from $10,000 to $25,000. It manufactures special printing machinery and will add some equipment for increasing its output.

Further plans given out by the Long & Allstatter Co., Hamilton, Ohio, are to the effect that the newly acquired wood-working machinery plant of the Bentel & Margedant Co., will be used for foundry purposes. The present buildings will be remodeled.

It is reported that the Smith Gas Engineering Co. will build a large plant at Dayton, Ohio. The company is now located at New Lexington, Ohio.

The W. E. Lamneck Co., Columbus, Ohio, maker of furnaces and furnace fittings, is building an addition to its plant on West Fifth Avenue, principally for storage purposes.

The Columbus Galvanizing Co., Columbus, was recently formed to operate an electro-galvanizing plant at 218 North Fourth Street. This plant was formerly occupied by the United States Wringer Co.

The Kelly-Springfield Motor Truck Co., Springfield, Ohio, expects to complete soon an addition to its factory, 70 x 170 ft., two stories, of concrete and brick construction. The addition was made necessary by the increasing demand for trucks from the Government and other users.

It is reported that the Laughray Enamel Silo Co., Sparta, Mich., will establish a branch plant at London, Ohio. M. B. Armstrong, London, may be addressed for further information.

Work has begun on remodeling the plant of the Superior Portland Cement Co., Ironton, Ohio, recently acquired by the Wellston Iron Furnace Co., Jackson, Ohio. The plant is expected to be in full operation within 30 days.

The Jeffrey Mfg. Co., Columbus, has had plans prepared for a two-story brick and stone addition, 50 x 75 ft. It will be used as a hospital and a research laboratory.

Chicago

CHICAGO, April 1.

The closing days of the month brought two or three large lists and a rush of orders for single tools required to balance equipment in munitions shops, the latter activity probably being due to criticisms of delay in getting Government work on a production basis. Despite this buying, with several dealers orders in late March were not as large as in the early part of the month.

The issuance of a list of general railroad shop equipment, required for the Chicago, Burlington & Quincy Railroad, is of decided interest. About 100 items are listed which, for the most part, are to have motor drive. Quotations are to be f.o.b. Chicago. This is the largest railroad list which has appeared in many months.

Another list was sent to the machinery trade by the Corn Products Refining Co., Argo, Ill., deliveries to be f.o.b. Argo. Some 300 tools are wanted.

The Standard Steel Car Co., which, as previously reported, has been a heavy purchaser, is working on another list of requirements.

The Inland Steel Co., Indiana Harbor, Ind., which is building a new machine shop, is in the market for a few machines, including a boring mill, and planing, slotting and gear cutting machines.

The National Tool & Mfg. Co., St. Louis, recently the purchaser of a few tools, has made tentative inquiry for 20 turret lathes.

The Maxwell Motor Corporation, Newcastle, Ind., is extending its equipment.

The smaller tools wanted by the companies mentioned can be supplied with no great delay in delivery, but the large machines will require from 4 to 8 months, and the uncertainty as to the exact time is great, for the reason that pressing priority orders may cause them to be shunted in other directions when they are completed.

The general contract for a one-story machine shop, 72 x 100 ft., 4501 to 4517 West Twenty-sixth Street, Chicago, for the Diamond Motor Car Co., at that address, has been awarded to the Henry Appel Co, 1851 Elston Avenue, Chicago. It will cost $15,000.

August Carlson, 7411 Champlain Avenue, Chicago, has been awarded the general contract for a one-story addition, 30 x 100 ft., to the plant of the Wildman Boiler & Tank Co., 3026 Carroll Avenue, Chicago. It will cost $6,000 and be used as an assembling room.

O. E. Brooks & Son, Desplaines, Ill., have been awarded the general contract for two one-story factory buildings, 76 x 100 and 80 x 192 ft., to be erected at Desplaines for the Benjamin Electric Co., 126 South Sangamon Stret, Chicago. The buildings will be of mill construction and cost about $50,000.

The Ghent Motor Co., Ottawa, Ill., has been consolidated with the Victor Motor Co., Chicago, T. F. Lamon, president. The Victor Motor Co., manufactures motor trucks and the Ghent company a motor car.

The American Truck & Aeroplane Co., Kankakee, Ill., has purchased the former plant of the Unifile Co. at Riverview, Ill., and is planning the assembling of motor trucks and later on aeroplanes. The company has a capital stock of $1,000,000. Some of the machinery now in the plant will be utilized.

The Twin City Forge & Foundry Co., Stillwater, Minn., which has several war contracts, continues to erect buildings to add to its floor space. It has seven structures in use.

A loss estimated at $70,000 to $80,000 was caused, March 18, by fire, which practically wiped out the foundry of the Berry Iron & Steel Co., St. Joseph, Mo. The foundry covered

an entire block. It employed 125 men and has been engaged on Government contracts.

The Modern Cotton Machinery Corporation, Duluth, Minn., has been incorporated in Delaware with a capital of $500,000 to manufacture machinery. M. H. Allen, L. A. Barney and F. M. Hunter, Duluth, are the incorporators.

The Kropp Forge Co., West Twenty-first Street, Chicago, has had plans prepared for the erection of a new one-story plant, about 150 x 350 ft., at Cicero, Ill., to cost $60,000.

Milwaukee

MILWAUKEE, April 1.

Machine-tool business booked by local manufacturers in March averaged up well with any of the last 10 months and exceeded that of the corresponding month of 1917. Production also shows an increase of from 20 to 25 per cent, partly due to additional facilities. New business continues in large volume. In the past week the Government sent out numerous inquiries for machines which are believed to be needed especially for shipbuilding. Inquiries and orders are coming from various sources for one or two tools, with here and there a small lot calling for urgent delivery. Even with shops running 24 hr. per day, it has been found impossible to make an appreciable gain on deliveries.

The Pelton Steel Co., Elliott Place and Chicago Road, Milwaukee, is considering the further enlargement of its plant, which contains a large electric furnace unit. Schuchardt & Judell, architects, 510 First National Bank Building, Milwaukee, are preparing tentative plans and estimates for two new structures, 84 x 160 and 65 x 85 ft., one-story, of reinforced concrete, steel and brick, equipped with an electric traveling crane and other machines. A decision to proceed with the work has not yet been made and will await the completion of estimates. T. H. Harvey is general manager.

The department of public works, Milwaukee, has directed C. E. Malig, municipal architect, to prepare estimate of a one-story building, 100 x 200 ft., with an annex, 20 x 30 ft., at Clinton and Florida streets, to be used as a water meter repair-shop and cast iron pipe warehouse, with a garage in connection. An investment of $50,000 is contemplated. Percy Braman is commissioner of public works.

The Madison-Kipp Lubricator Co., Madison, Wis., manufacturer of lubricating devices, has awarded a contract to George C. Crane & Son, Madison, for the erection of a second-story addition to the new shop and office building. It will be used for light machine work and assembling purposes and will cost about $35,000 with equipment.

Otto R. Pfau, 248 Fourth Street, Milwaukee, manufacturer of compressed air motor water pumping systems, has incorporated under the name of the Pfau Motor Pump Co., with authorized capital stock of $30,000. Maynard S. Matteson, Unity, Wis., who is financially interested, is general superintendent of the manufacturing department.

The Boggess Mfg. Co., Fond du Lac, Wis., has started production of mop wringers and other specialties in its new plant in the Hass Building, Second and Macy streets. A galvanizing unit and some other metal-working equipment remain to be purchased. A. M. Boggess is president and general manager.

The Ampco Rolling Mills Corporation, 209 Security Building, Milwaukee, which purchased the former plant of the Globe Iron Works and Laursen Automatic Pump Co., at Menomonie, Wis., has engaged J. C. Lauren to prepare plans and specifications for converting the group into a foundry and rolling mill for the manufacture of bronze materials. A gas furnace will be installed temporarily, pending the delivery of an electric unit. The manufacture of wire for airplanes will be a particular feature of the production.

The Ashland Light, Power & Street Railway Co., Ashland, Wis., will erect a new hydroelectric plant at Superior Falls, Wis., at an estimated cost of $100,000. The work is in charge of L. E. Meyers Co., 58 West Jackson Boulevard, Chicago, engineer and contractor.

The A. J. Lindemann & Hoverson Co., Milwaukee, sustained an estimated fire loss of $40,000 on March 26. The shop will be replaced immediately.

The Wisconsin Aluminum Foundry Co., Manitowoc, Wis., is reported to be contemplating the establishment of a branch plant at Rice Lake, Wis., at an estimated cost of about $25,000. Definite details are withheld for the present.

The Jonas Lalley Light Co., Milwaukee, has been incorporated with a capital stock of $25,000 to manufacture and install electric lighting systems for isolated localities. The incorporators are August A. Jonas, John P. Peterson and Gustave Jonas.

A new corporation with an authorized capital stock of $250,000 is being organized in the Fox River valley to erect a plant in Appleton, Wis., for the manufacture of paper machines, heavy machinery, wire looms, rice hulling looms and paper mill equipment. The promoters include large paper mill owners of the district. Originally it was intended to build the plant during the summer of 1917, but owing to conditions it has been postponed until now.

The West Bend Aluminum Co., West Bend, Wis., has decided to proceed with plans for the construction of factory additions and other improvements involving an expenditure of $60,000 or more, which were projected a year ago but delayed by conditions in the building material and labor markets. Contracts will be awarded about April 8 for the construction of a three-story building, 70 x 200 ft., and a one-story addition to the present shop, 50 x 60 ft., all of reinforced concrete, steel and brick. B. C. Ziegler is general manager. The work is in charge of the Federal Engineering Co., Stephenson Building, Milwaukee.

The Topp-Stewart Tractor Co., Clintonville, Wis., has started operations in its new plant and by May 1 expects to be able to begin the production of gas and oil tractors on a large scale. The installation of equipment has been completed and parts are now being turned out in quantities. The plant represents an investment of about $50,000.

Cleveland

CLEVELAND, April 1.

There is a marked increase in the buying of machine tools by the Government, which is attributed to some extent to the turn of events on the western fighting front. The demand for small lots continues very active, most of the business coming from manufacturers having Government work, and, as a rule, is wanted for immediate delivery. The urgent needs of some buyers are shown by a telegraphic order from New England received the past week for three large automatic machines to be shipped by express. It is announced that production will be doubled in some lines of war equipment. Orders were placed late last week by the Standard Parts Co., Cleveland, for 35 to 40 machines for its American ball bearing plant in Cleveland for work on rear axles for the largest type of Liberty trucks. Government representatives came from Washington to attend to the buying of this machinery, and the speed with which the order was placed was in marked contrast with the delay that usually occurs between the sending out of a Government inquiry and the placing of an order. The order includes boring, drilling, milling and broaching machines. Some small lot orders for truck axle work have also been placed by the Torbensen Axle Co., Cleveland, and the Timken-Detroit Axle Co., Detroit. A new inquiry has come from the Adams Axle Co., Findlay, Ohio, for 20 36-in. lathes. The Savage Arms Corporation, Utica, N. Y., is expected to place orders this week for a large lot of machinery which has been pending for some time, including 80 to 90 screw machines.

A local company having orders for a large number of automatic machines for England has received cancellations for many of the smaller sizes on account of the scarcity of vessel capacity. It is understood that cargo space is being cut wherever possible to make room for foodstuffs. A Cleveland automobile company, which has been building motor trucks for the British Government since the beginning of the war, is reported to have had its contract terminated for the same reason. A local machinery house took 78 14-in. lathes and 20 hand screw machines as a part of the order recently placed by the National Cash Register Co., Dayton, Ohio. It is understood that this equipment will be used in the manufacture of instruments for airplanes.

There is a good demand for locomotive cranes for Government use and coal handling purposes. Conditions in the local gray iron foundry trade show some improvement, although plants are still running at less than full capacity. Steel and malleable foundries are crowded with Government work, but brass foundries are running very light because of a falling off in the demand for plumbers' brass goods, due to the limited activity in building lines.

The National Acme Co., Cleveland, has about completed its new plant on East 131st Street, and expects to begin operations some time in April. It will be devoted to the manufacture of screw machine products.

Frank E. Hulett, G. H. Hulett and C. A. Boyd, who recently organized an engineering company and established offices at 301 Union Building, Cleveland, have incorporated as the Hulett-Boyd Co. The three men associated in this company were formerly connected with the Wellman-Seaver-Morgan Co., Cleveland, F. E. Hulett having been engineer in charge of the coal handling equipment, G. H. Hulett, vice-president, and C. A. Boyd, works manager. F. E. Hulett is president of the Hulett-Boyd Co. and G. H. Hulett and C. A. Boyd, vice-presidents.

The Borden Co., Warren, Ohio, manufacturer of pipe threading machines, has placed a contract for the construc-

tion of an addition which will double the capacity of its plant.

The Akron Standard Mold Co., Akron, Ohio, will build a one-story factory, 60 x 100 ft.

The Central Rubber Co., Defiance, Ohio, has purchased the factory buildings of the Diamond Glass Co., East Defiance, in which it will establish a plant.

The Dall Motor Parts Co., Vermilion, Ohio, has placed contracts for the erection of an addition to its plant.

The Humphrey Bronze & Aluminum Co., Bellefontaine, Ohio, has been incorporated with a capital stock of $10,000. It recently placed a new plant in operation.

The Phoenix Electric Co., Mansfield, Ohio, has moved into a new two-story brick plant, considerably increasing its former capacity.

Indianapolis

INDIANAPOLIS, April 1.

The American Fuel Saving Engineering Corporation, Fort Wayne, Ind., has been incorporated with $1,000,000 capital stock to manufacture fuel-saving and smoke-consuming devices. The directors are Austin W. Stultz, Charles H. Hall and Bruce M. Wylie.

The Will-Do-It Mfg. Co., Indianapolis, has been incorporated with $10,000 capital stock to manufacture metal containers. The directors are Edward F. Jones, Darwin A. Medaris and Harvey W. Taylor.

The General Repair & Machine Co., Connersville, Ind., has changed its name to the Valley Machine Works, Inc.

The Liberty Tractor Co., Hammond, Ind., has been incorporated with $50,000 capital stock to manufacture tractors and farm implements. The directors are Frank E. Gossett, Cornelius Moor, L. H. Whitaker, Max Salmon and Herman Rettig.

The Attica Electric & Power Co., Attica, Ind., will issue $50,000 in stock and $50,000 in bonds, the proceeds to be used to build a new plant to take the place of the municipal power house recently destroyed by fire.

The Home Lighting & Storage Battery Co., Newcastle, Ind., has been incorporated with $25,000 capital stock to manufacture storage batteries. The directors are Samuel N. Denton, Luther O. Draper and Isaac E. Hays.

Detroit

DETROIT, April 1.

An increasing number of inquiries for standard machines is noted with the placing of more Government contracts. Lathes are in special demand.

Detroit is facing a serious shortage of skilled labor, large munition plants being unable to keep up production demanded by contracts. The Government is weekly taking several hundred skilled mechanics from the city, and unless these can be replaced the production of airplanes, guns and shells will fall further behind.

The Harroun Motors Corporation, Wayne, Mich., has received a Government order for shells estimated at more than $2,000,000. The necessary equipment is being rushed to the plant, and within a short time it is expected that in this department more than 1000 men will be employed. The work will be done in a separate section and will not interfere with the regular production of the Harroun passenger cars.

The Packard Motor Car Co., Detroit, has purchased property in Chicago involving $300,000. It is planned to erect a six or eight-story truck and passenger service station, 200 x 316 ft., to cost $500,000.

The Towar Motor Truck Co., Greenville, Mich., has increased its capital stock from $100,000 to $200,000.

The Timken-Detroit Axle Co., Detroit, has let a contract for an addition to its Plant No. 21, at Clark Avenue and West Fort Street.

The controlling interest in the American Brass Novelty Co., Grand Haven, Mich., has been purchased by Charles D. Reeve, vice-president and general manager of the Grand Rapids Brass Co., and D. J. Gorman, Eastern representative of the Keeler Brass Co., Grand Rapids.

The Ford Motor Co., Detroit, will start work within a few days upon a group of 17 shops adjacent to its main plant in Highland Park, where Liberty motors will be assembled and tested. Owing to the large Government order which the company received, and with a view to bringing about the greatest efficiency in output, it was thought advisable to do as much of the work as possible in special buildings. It is stated that it is not the intention of the company to maintain these structures permanently.

The Kroeschell Brothers Ice Machine Co., Detroit, formerly of Chicago, has been incorporated for $110,000.

Nelson Brothers & Co., Saginaw, Mich., have purchased the plant of the Saginaw Motor Car Co. and have organized the Nelson Brothers Truck Co., with a capital stock of $300,000, to manufacture trucks. It is stated that a new plant will be erected. H. B. Nelson is president, and C. J. Nelson, secretary and treasurer.

Alfred O. Dunk, president of the Puritan Machine Co., Detroit, has announced the purchase of the Yale Eight Motor Car Co., Saginaw, Mich., which was located in the plant bought by Nelson Brothers & Co., and for which the Puritan company supplied parts.

The Fox Typewriter Co., Grand Rapids, Mich., has increased its capital stock from $250,000 to $450,000, to care for increasing business.

The Champion Ignition Co., Flint, Mich., a subsidiary of the General Motor Co., is buying equipment for the manufacture of speedometers, its present line being spark plugs.

The Studebaker Corporation, Detroit, has recently bought some equipment for the manufacture of gun carriages.

The Central South

LOUISVILLE, April 1.

While the general foundry business is not showing much improvement, inquiries for boilers and pumps are better than for some time past. Ice machinery is also more active.

The Continental Car Co., Louisville, manufacturer of contractors' cars, trucks and railroad equipment, has increased its capital stock from $100,000 to $200,000.

The Tri-State Metal Weather Strip Co., Covington, Ky., has been incorporated by John Gaiser, L. B. Simpson and others with a capital of $1,000. The company is in the market for a Cleveland punch and shear, with 36-in. throat, complete with angle split and bar shears, to punch 1¼-in. hole in 1¼-in. plate.

Elvis Page, Arlington, Ky., who is establishing a new sawmill, announces that he will add a machine shop.

The Claremont Marl Products Co., Claremont, Va., recently incorporated with capital of $250,000, wants prices on a steam shovel, with 3 to 5-yd. dipper; pulverizers, hoists, 100-hp. steam plant, including boilers and engines.

The Ken-See Mineral Co., Winchester, Ky., desires prices on pumps, hoists, compressors, jack hammer drills, and kerosene engine.

Texas

AUSTIN, March 30.

The grain elevator of the G. B. R. Smith Milling Co., Sherman, which was recently destroyed by fire, entailing a loss of $90,000, will be rebuilt.

The Somerton Cotton & Commercial Co., Yuma, Ariz., will build a 40-ton cottonseed oil mill and a cotton gin, to cost $40,000.

The Cosdon Refining Co., Tulsa, Okla., which has large oil interests in the Brownwood field of Texas, has established headquarters at Fort Worth and, it is reported, will construct a large oil refinery. The company has a capital stock of $50,000,000.

The East Texas Canal Co., Beaumont, has been incorporated with a capital stock of $40,000 to take over and extend a large irrigation system near here. Capt. W. C. Tyrrell is president.

The New York Buyers' Association, San Antonio, will build a cold storage plant to cost about $60,000.

The Hills, Sutton & White Mfg. Co., El Paso, Tex., sheet metal worker, has increased its capital from $15,000 to $35,000.

The Galveston Dry Dock & Construction Co., recently incorporated, has acquired property, 700 x 1800 ft., on Pelican Island, for its proposed repair plant. H. H. Langben, president.

California

LOS ANGELES, March 26.

The United States Steel Shipbuilding Corporation, San Diego, has filed plans for the erection of a new one-story shop building to cost about $20,000.

The United States Concrete Pipe Machine Co., Los Angeles, has been organized. F. S. Winchell, 152 West Twenty-fourth Street, heads the company.

J. C. Coleman, 749 Maple Avenue, Los Angeles, is having plans prepared for the construction of a new machine shop

and assembling works, 120 x 200 ft., at 1710 East Ninth Street, to cost $10,000.

The Stearns Safety Razor Co., Huntington Beach, recently incorporated, is planning for the establishment of a factory. M. B. Stearns is president and M. E. Helme, secretary-treasurer.

The Southwestern Shipbuilding Co., Los Angeles, has been incorporated with a capital of $1,000,000 to build vessels. Arthur C. Hurt, E. A. Mills, J. D. Flora and John C. Cain, Los Angeles, are the incorporators.

The Long Beach Sheet Metal & Auto Works, 330-32 Locust Avenue, Long Beach, Cal., will erect a one-story addition, 50 x 150 ft.

Clyde Bishop, Long Beach, is arranging for the organization of a company with $100,000 capital and the establishment of a plant for the manufacture of Liberty carburetors, invented by G. E. Riblet, Long Beach.

President Mason and other officials of the Western Pipe & Steel Co., San Francisco and Los Angeles, are organizing a company to establish a shipyard at Los Angeles Harbor to build steel vessels. The initial plant will have four shipways, with assembling, riveting and other shops. The new organization is said to have obtained Government contracts for building 10 steel vessels, each of about 9500 tons capacity. Local offices are at 1758 North Broadway, Los Angeles.

The Schumacher Wall Board Co., Los Angeles, will build a one-story extension at San Pedro and Fifty-eighth streets, 80 x 160 ft.

The Harbor City Boat Co., San Diego, has been incorporated with a capital of $12,000. William H. Taggart, Hester A. Baker and John A. May, San Diego, are the incorporators.

Application has been made by the Sierra & San Francisco Power Co., Modesto, for permission to issue $1,000,000 in bonds for extensions, to include a new hydroelectric plant on the Middle Fork of the Stanislaus River, and other auxiliary stations.

The Shasta Land & Timber Co., Redding, is reported to be planning to rebuild its electric power plant and planing mill, recently destroyed by fire with loss of about $45,000.

The Pacific Northwest

SEATTLE, March 26.

One of the most serious obstacles to the expansion of industries in this section is the extreme car shortage. Lumbermen are getting barely 10 per cent of their requirements in freight cars, and out of this Government orders must first be taken care of. The mills have less than 30 per cent of the cars they need, and millions of feet of lumber are piling up in yards and warehouses. Approximately 13,000 carloads of orders are now awaiting shipment.

Pacific Coast manufacturers are making a strong effort to obtain contracts for a portion of the railroad cars that the Government proposes to either construct or purchase. It is stated that many car manufacturers could readily take care of additional work.

Industries are seriously handicapped by the shortage of labor. The shipyards are attracting thousands of mechanics at wages that other plants cannot afford to pay. A partial solution of the problem has been reached by employment of women, but this does not supply the demand for skilled mechanics. The call for grain handling and cleaning equipment or labor-saving devices is unprecedented. Machinery and supply houses catering to the cannery trade report an exceptionally active business.

The Western Irrigation & Development Co., Moscow, Idaho, has been incorporated with $50,000 and will manufacture a water-lifting device. A plant will be located near Moscow.

Frank G. Tillman and associates, Portland, Ore., will erect a sawmill near Woodland, Wash., to have a daily capacity of 1000 to 1200 railroad ties.

The Bay City Shipbuilding Co., Salem, Ore., capitalized at $150,000 by H. E. Hartline, Scott Bozorth and E. A. Baker, contemplates the construction of a plant at Bay City.

The Hurley-Mason Co., Tacoma, Wash., announces that it will begin the construction of concrete ships in or near Tacoma in the near future. The plant will at first build 3500-ton vessels, and later be equipped to build vessels of 6000 tons. The initial investment will be $100,000. Charles B. Hurley is president.

The Columbia River Shipbuilding Corporation, Portland, plans to install two additional ways, which will give it an output of 18 wooden vessels yearly.

The plant of the Raymond Concrete Pile Co., Portland, was recently damaged by fire with loss of about $5,000 to machinery.

The King Brothers Boiler Works, Portland, will erect a one-story machine and boiler shop.

The Atlas Foundry Co., Tacoma, Wash., will erect a machine shop in connection with its plant.

The Spokane Sheet Metal Supply Co., Spokane, organized with a capital stock of $50,000, will build a warehouse for the distribution of sheet metal products in the Northwest.

The Supple-Ballin Shipbuilding Corporation, Portland, has leased a site on which will be established a fitting-out yard devoted exclusively to the installation of machinery in wooden steamers. It will accommodate six vessels, and two additional slips will be added later. Machine shops will be erected.

The Pacific Boiler Works, Tacoma, Wash., will erect a machine shop to cost $1,500, exclusive of equipment.

The Willamette Iron & Steel Works, Portland, has capacity in its newly completed boiler shop for about seven boilers per month. It has contracted with the Government to deliver vessels, complete with machinery and boilers.

The Preston Shaffer Milling Co., Athena, Ore., will erect a concrete grain elevator at Freewater, Ore., to have a capacity of 85,000 bu. Handling and cleaning equipment will be installed.

It is stated that the Twohy Brothers Co., Portland and Seattle, has Government contracts amounting to approximately $30,000,000, which include $17,000,000 for steel ships, over $1,000,000 for airplanes, and a considerable amount for freight cars to be built in the company's shops at Portland.

The Western Blower Co., Portland, has had plans drawn for a new factory, 65 x 80 ft., to cost $5,000.

The Seaborn Shipyards, Tacoma, are building a $15,000 machine shop for outfitting ships.

The Lamb Machine Works, Hoquiam, Wash., is constructing a new machine shop and foundry, each 80 x 140 ft., on a 6-acre site recently acquired. An electric steel furnace will also be added.

The Oregon Marine & Fisheries Supply Co., Seattle, has been organized to take over the business of the Rober Machinery Co., dealer in marine and other machinery. D. B. McBride is president; Edward Cunningham, vice-president, and Carl J. Thomas, treasurer and general manager.

The Coast Engine Co., Seattle, has been organized by F. H. Teuss and F. Hoyt, and has opened headquarters at 80 Marion Street.

The Norway-Pacific Construction Co., Portland, will erect a plant for the manufacture of marine motors, near the mouth of the Columbia River, at a cost of about $1,000,000.

Canada

TORONTO, April 1.

The Waltham Watch Co., Ltd., Montreal, has been incorporated with a capital stock of $500,000 by Louis A. David, Louis P. Crepeau, S. H. R. Bush and others, to manufacture watches, clocks, compasses, binoculars, etc.

The Consolidated Equipment Co., Ltd., Montreal, has been incorporated with a capital stock of $25,000 by Herbert Ewan and John H. Dunlop, both of Montreal; Homer B. Laduke of St. Lambert, Que., and others to manufacture tools, machinery, etc.

The Peerless Jewelry Co., Ltd., Sherbrooke, Que., has been incorporated with a capital stock of $100,000 by Louis A. David, Louis P. Crepeau, S. H. R. Bush and others of Montreal, to manufacture clocks, watches, jewelry, cutlery, etc.

The Hercules Rubber Co., Ltd., Toronto, has been incorporated with a capital stock of $150,000 by John A. Campbell, 24 King Street West; James L. Ross, Jacob H. Greenberg and others to manufacture tires, rubber goods, etc.

The Peerless Rubber Co., Ltd., Toronto, has been incorporated with a capital stock of $60,000 by Herbert B. E. Scott, Frederick C. Noice, John A. MacInnis and others to manufacture rubber specialties.

The Canada Casting Co., 750 St. Paul Street, West, Montreal, has awarded contracts for the erection of a plant estimated to cost $60,000.

Keenan Brothers, Ltd., Owen Sound, Ont., is in the market for a 60 to 75 hp. engine.

Strathroy, Ont., will spend $5,000 for the purchase of a motor-driven turbine pump, for the municipal waterworks.

Bradley Brothers, Oshawa, Ont., are in the market for a 5-hp., 220 volt, single phase motor.

A. H. Aunger, 759 Pape Avenue, Toronto, is in the market for a 5-hp. and a 20-hp. motor.

Bids will be called about April 15 for the erection of an elevator at Port Arthur, Ont., for the Saskatchewan Co-operative Elevator Co., 332 Grain Exchange Building, Winnipeg, to cost $450,000.

The Canadian Allis-Chalmers Co., Lansdowne and Royce

avenues, Toronto, will build an addition to its forge shop to cost $6,000.

Plans are being prepared for remodeling the foundry of the Welland Iron & Brass Co., Welland, Ont., and the installation of new machinery. E. J. Anderson is manager.

The Milton Shipbuilding Co., Yarmouth, N. S., proposes to build a plant estimated to cost $100,000. Armand Deveaux is interested.

The Fraser River Shipbuilding Co., New Westminster, B. C., has been organized to build wooden, steel and concrete ships of large tonnage. It has secured a site on the Fraser river, and work will be started immediately on the construction of a plant.

The Sydney Rubber Roofing Co., Ltd., which has a plant at Sydney, Vancouver Island, B. C., is seeking to establish a plant in Vancouver, B. C., involving an initial expenditure of $125,000.

The Monarch Tractor Co., Watertown, Wis., will shortly begin the erection of its Canadian plant on Sydenham Street, Brantford, Ont.

The St. Catharines Taxicabs, Ltd., has been incorporated with a capital stock of $40,000, by Francis J. Murphy, Frazer F. Summers, George B. Burson and others to manufacture automobiles, bicycles, motors, engines, etc.

Arthur Balfour & Co., Ltd., incorporated under the laws of Great Britain to manufacture machinery, tools, etc., has been granted a charter to do business in Ontario with a capital stock of $40,000. John L. Milner, 19 Nanton Avenue, Toronto, has been appointed to represent the company.

The L. D. Caulk Co., incorporated under the laws of Delaware, has been granted permission to manufacture dental supplies, instruments, etc., in Ontario, with a capital stock of $70,000. J. Doan Musselman, 172 John Street, Toronto, represents the company.

Government Purchases

WASHINGTON, April 1.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until April 9 schedule 1751, for two 16-in., back-geared motor-driven extension shapers for Philadelphia.

NEW TRADE PUBLICATIONS

Power Transmission Chain.—Link-Belt Co., Thirty-ninth Street and Stewart Avenue, Chicago. Bulletin No. 359 entitled "Chain-Driven Motor Trucks and Tractors." Points out the advantages of the chain type of drive for motor trucks and tractors with special reference to the use that is made of the company's roller chains, for transmitting power to the driving wheels of tractors and trucks. A brief description of the construction of the chain is presented, supplemented by illustrations of the different members and some of the tractors and trucks in which it is used.

Dies.—Greenfield Tap & Die Corporation, Greenfield, Mass. Pamphlet. Refers to the Wells self-opening die for use on long threaded work and pieces having a large diameter and fine pitch. The features of design and construction that should be possessed by a die of this type to be thoroughly satisfactory in service are analyzed and it is pointed out how this particular die fulfills these requirements. Illustrations, brief descriptions and condensed specification tables of the various members of the line are presented and the text is further supplemented by a number of views of the dies in use.

Turret Lathes.—Gisholt Machine Co., Madison, Wis. Bulletin entitled "Increasing Production with Gisholt Machines." Calls attention to various parts which have been produced in large quantities on the company's standard turret lathe. Illustrations and brief descriptions of the different pieces are presented and in some cases dimensioned drawings are included. The time of production is featured in every instance.

Steel Tanks.—Warren City Tank & Boiler Co., Warren, Ohio. Calendar hanger measuring 15½ x 22½ in. Is a somewhat unique advertisement for the company's line of steel tanks in that the greater portion of the hanger is given over to a color drawing which in no way relates to steel tanks. The only advertising is the name of the company and the address in rather inconspicuous type. The pad while small is nevertheless easily read.

Lock Nut.—Holdfast Nut & Bolt Co., 1405 Corn Exchange Building, Chicago. Pamphlet. Illustrates and describes a special form of lock nut which is claimed to attach itself to the bolt so securely as to make the nut and bolt a single piece, no keys, extra nuts, washers or separate parts being required. The nuts are put in place with a wrench and lock upon the bolt as soon as the threads are engaged, no jamming or springing being necessary. Results of a number of tests made on the nuts are included.

Wire Nails and Tin Plate Products.—American Steel Co., Park Building, Pittsburgh. Pamphlet. Gives considerable information regarding the manufacture of wire nails, together with the present card in effect and the extras applying thereon. Mention is made of the Kelkotter self-spreading cotter pins and photographs showing the method of manufacturing tin plate are presented with detailed information regarding the various products of the company. A number of tables of useful information are included.

Safety Switches.—Krantz Mfg. Co., 160 Seventh Street, Brooklyn, N. Y. Special publication No. 1585-A. Illustrates and describes in some detail a line of safety auto-lock switches which are designed for use as a substitute for ordinary knife type on electric circuits. Emphasis is laid upon the impossibility of touching live parts of the switches which are adapted for use in steel mills, factories, mines and similar locations where the men employed have no practical knowledge of electricity.

Drum and Automatic Motor Starters.—General Electric Co., Schenectady, N. Y. Circulars Nos. 68201 and 68410. The first points out the advantages of using the drum type switch for throwing small alternating or direct current motors across the line without the use of a starting resistance. The various styles of switches that can be supplied are illustrated and briefly described and the different features are pointed out by a series of panels around the illustrations with leaders running to the various parts. In the other circular illustrations and descriptive matter explain the operation of a line of automatic starters for direct-current motors. The application of this system to the control of industrial motors where automatic starting or stopping of shafting or machinery of any kind is desired is described and a number of views of typical installations are included.

Blast Furnace and Steel Plant Construction.—Pennsylvania Engineering Works, New Castle, Pa. Catalog. Presents a series of views showing the class and scope of work in which this firm specializes. These include blast and open-hearth furnaces, metal mixers and cars, converters, steel ladles, etc. A number of detail drawings supplement the views of actual installations.

Electric Heating Devices.—American Electrical Heater Co., Detroit. Folder. Illustrations and descriptive matter explain the operation and use of an extensive line of electric heating devices which include air heaters for use in places where other methods of supplying heat are not suited, electrically heated gluepots and soldering irons. Tables giving the various sizes of each type that can be supplied are included.

Blueprint Machinery.—C. F. Pease Co., 213 Institute Place, Chicago. Catalog B. This is the company's 1918 catalog illustrating and describing an extensive line of blueprinting machinery and drafting room supplies and furniture. The machines employed for making the blueprints print, wash and dry in a continuous operation, thus, it is emphasized, giving a more thorough washing and even drying. Tables of the various sizes of machinery and supplies that can be furnished are presented in a number of cases and a comprehensive index is included.

Buffing and Grinding Machine.—U. S. Electrical Mfg. Co., Los Angeles, Cal. Circular. Concerned with a self-contained motor-driven buffing and grinding machine which was illustrated in THE IRON AGE, June 21, 1917. Among the features upon which special emphasis is laid are great power, silence in operation and the use of a totally inclosed driving motor.

Lamp Hangers.—Thompson Electric Co., 5606 Euclid Avenue, Cleveland. Catalog B-17. Lists the various types of safety disconnecting hangers that can be supplied for use with incandescent lamps. Emphasis is laid upon the safety feature of the hanger by which the lamp is absolutely disconnected from the circuit as soon as the trimmer begins to lower it. A number of views of the hanger in use together with others showing the methods of installation for various conditions and the attachments employed are included.

Industrial Plant Construction.—John W. Cowper Co., Fidelity Building, Buffalo. Pamphlet. Presents a brief summary of the advantages to be gained by employing a standardized form of construction for industrial plants. This includes saving in cost, economic use of material and rapidity of construction. Brief descriptions of the single and multiple story standard buildings which the company is prepared to erect are given. The text is supplemented by numerous drawings of details and views of plants constructed along these lines are included.